Men-at-Arms

OSPREY PUBLISHING

Dutch Armies of the 80 Years' War 1568–1648 (2)

Cavalry, Artillery & Engineers

Bouko de Groot • Illustrated by Gerry Embleton

Men-at-Arms . 513

Dutch Armies of the 80 Years' War 1568–1648 (2)

Cavalry, Artillery & Engineering

Bouko de Groot . Illustrated by Gerry Embleton

Series editor Martin Windrow

CONTENTS

INTRODUCTION 3
- Background

CHRONOLOGY 4
- Sieges and related events

CAVALRY 6
- Civil War, 1568–87: organization – in the field – the soldier's equipment
- War for Independence, 1588–1620: organization – in the field – combat drill – the soldier's equipment
- Coalition War, 1621–48: organization – in the field – the soldier's equipment

ARTILLERY 15
- Civil War, 1568–87: organization – in the field – equipment
- War for Independence, 1588–1620: organization – in the field – equipment
- Coalition War, 1621–48: organization – in the field – equipment

ENGINEERING 21
- Field engineering – bridging – the siege – trench warfare

THE ARMY 34
- Command
- Movement and deployment: Civil War, 1568–87 – War for Independence, 1588–1620 – Coalition War, 1621–48

CONCLUSION 41
- The modernization of warfare – the legacy

SELECT BIBLIOGRAPHY 43

PLATE COMMENTARIES 44

INDEX 48

DUTCH ARMIES OF THE 80 YEARS' WAR 1568–1648 (2)

CAVALRY, ARTILLERY & ENGINEERING

INTRODUCTION

The 80 Years' War was the long struggle by the Netherlands for independence from the globe-spanning Spanish empire. As explained in the previous volume (MAA 510, *Dutch Armies of the 80 Years' War 1568–1648 (1): Infantry*), this conflict started as an uprising against religious intolerance, higher taxation, and the stripping of traditional prerogatives from local rulers. The most senior among these was William 'the Silent', Prince of Orange, Count of Nassau and Buren, who had been a favourite of the previous Spanish king. The new Spanish monarch, Philip II, outlawed William, and declared the whole Dutch population heretics.

After two years of disturbances and exemplary punishments, the outbreak of the war proper is traditionally dated to the rebels' first victory at Heiligerlee in May 1568. This triggered years of vicious civil war between rebels and royalists, but the rebels created a union of their 17 provinces of the Low Countries. Not long after the defeat of their first national army at Gembloers in 1578, the ten southern provinces made peace with their oppressor; but the others created the Republic of the Seven United Provinces governed by its assembly, the States General. (In this text, the term 'States' is used for the rebel government.)

Soon after William's assassination in 1584, his son Maurice of Nassau took over as *Stadhouder* ('Stead-Holder', or lord steward) and military captain-general, in what was now an outright war for national independence. Inspired by classical military treatises, and with the help of his cousins William Louis and John 'the Middle' of Nassau, Maurice created a standing army, with smaller and more flexible tactical units, rigorous financial control, educated officers, standardized equipment, and – most importantly – a unified system of drill. Endless exercise using a limited number of common commands, obeyed in step, gave Maurice a disciplined, steadfast and effective tool to defeat the Spanish.

After first recovering most of the country from the royalists he took the fight to the Spanish, and in 1600 he won the battle of Nieuwpoort, which brought him international fame. Before his death in 1625 Maurice further refined the infantry, creating a corps of skirmishers. His half-brother Frederick Henry succeeded him; by then the pan-European Thirty Years' War (1618–48) had reached western Germany across the border, and this motivated the young Republic to form a coalition with France. Peace finally came in 1648, by which time the United Provinces were already wealthy from international maritime trade.

The first book in this two-part study (MAA 510) includes a Chronology and a map of *open-field battles*. Overleaf the Chronology and map show only the many *sieges*.

Simon Stevin (1548–1620), the country's leading mathematician, was an important collaborator in Maurice's army reforms. He introduced the decimal system, applied rigorous accountancy to the army's bookkeeping, produced standard designs for camps and fortifications, and, to ensure reliable maps for the army, in 1600 he founded a chair for land-surveying at Leiden University. Stevin was also an avid inventor, though neither a folding spade-pickaxe that he devised for the infantry, nor the 'sailing carts' that Maurice enjoyed riding on flat beaches (his only known leisure pastime), were in fact adopted for the army. (Velijn, 1821, based on 17th-century original; RM)

CHRONOLOGY

Note that within its year, each siege is given a lower-case letter indicating the chronological sequence within that year; this is sometimes followed (in brackets) by any common alternative spelling of the name, and always by a capital letter/number coordinate to locate it on the map. For example: in the Chronology under 1572, the second siege was 'b', that of Vlissingen, also known as Flushing, to be found in map square B2, where it is marked as '+72b'.

Some other relevant cities or locations mentioned in the text but not besieged are marked on the map as follows: +Col = Cologne (E1); +Ge = Gembloers (C1); +Hei = Heiligerlee (E5); +Mu = Münster (E3); +Nie = Nieuwpoort (A2); +Nij = Nijkerk (D3); +TH = The Hague (B3); and +Tie = Tienen (C1).

Civil War, 1568–87

1568 b=Groningen (D5).
1572 a=Den Briel (B3); b=Vlissingen (Flushing, B2); c=Veere (B2); d=Middelburg (B2); e=Kampen (D4); f=Berg (Mons, B1); g-Goes (Tergoes, B2); h=Dokkum (D5) is massacred. Many cities side with the rebels. To deter others, Alva's Spanish army massacres i=Mechelen (Malines, B2) and j=Zutphen (D3). Most provinces then submit, but after the massacre of k=Naarden (C4) cities in Holland and Zeeland do not, with the notable exception of m=Amsterdam (C4), subsequently dubbed 'Murderdam' by the rebels. To cut rebel Holland in two, n=Haarlem (C4) is besieged, then massacred.
1573 siege a=Alkmaar (C4) fails, raising the rebels' hopes; b=Leiden (C3), in two parts …
1574 is rescued by flooding the land for a rescue fleet; a=Bommel (Zaltbommel, C3).
1575 a=Buren (C3); since b=Oudewater (C3) refuses to flood its surrounding countryside, the enemy march right up to its walls, besiege and massacre it; c=Schoonhoven (C3); d=Woerden (C3) holds out for almost a year; e=Bommenede (B3) holds out for three weeks before being massacred – only 15 of its 500 citizens survive; f=Zierikzee (B3).
1576 a=Krimpen (C3); b=Muiden (C4). Spanish mutineers take, sack and massacre c=Aalst (B1). Others march from Brussels to sack and massacre d=Maastricht (D1). They then march back, picking up those from Aalst, to start the sack and massacre of e=Antwerp (B2) – the 'Spanish Fury'. Spanish atrocities unite the population, forcing royalists to take refuge within their cities' citadels; some of these hold out, e.g. f=Gent (B2) and g=Utrecht (C3).
1577 a=Breda (C2); b=Antwerp (citadel); c=Roermond (D2).
1578 a=Kampen (D4); b=Deventer (D3); c=Binche (B1, French support); d=Zichem (C2) taken, then massacred; e=Nijvel (Nivelle, B1).
1579 a=Kerpen (E1), Spanish 'overkill' against a lone castle; b=Maastricht (D1). Royalist southern provinces form Union of Atrecht, rebel northern provinces Union of Utrecht.
1580 a=Groningen (D5); b=Delfzijl (D5); c=Steenwijk (D4); d=Kamerrijk (Cambrai).
1581 Declaration of independence by rebel provinces. a=Niezijl (D5); b=Doornik (Tournai, A1).
1582 a=Oudenaarde (B1); b=Lochem (D3).
1583 a=Eindhoven (C2); b-Duinkerken (Dunkirk, A2); c=Ieperen (A1); d=Gent (B2); e=Godesberg (part of the 'Cologne War', a neighbouring conflict supported by the rebels); f=Aalst (B1).
1584 Assassination of William. a=Zutphen (D3); b=Brussels (B1); c=Antwerp (B2) also refuses to completely flood its lands, and is taken after more than a year.
1585 Maurice becomes Stadhouder**.** a=IJsseloord (D3); b=Neuss (E2), part of Cologne War.
1586 a=Grave (D3) is surrendered despite intact walls, full stores, and a relieving army on its way; b=Venlo (D2); c=Rijnberk (D2) until 1590, part of Cologne War; d=Zutphen (D3).
1587 a=Sluis (B2).

War for Independence, 1588–1620

1587–88 Birth of Republic of United Provinces. a=Medemblik (C4); b=Bergen op Zoom (B2).
1589 a=Heusden (C3).
1590 a=Breda (C2); b=Noorddam (C2).
1591 a=Zutphen (D3); b=Deventer (D3); c=Knodsenburg (D3); d=Hulst (B2); e=Nijmegen (D3).
1592 a=Rouen (supporting France); b=Steenwijk (D4); c=Ootmarsum (E4); d=Coevorden (E4).
1593 a=Coevorden (E4) again.
1594 a=Groningen (D5); b=Zichem (C2) – mini-state of Spanish mutineers allied to Maurice.
1595 a=La Fere (supporting France); b=Groenlo (E3).
1596 a=Calais (supporting France); b=Hulst (B2).
1597 In just three months Maurice successfully besieges a=Rijnberk (D2); b=Moers (D2); c=Groenlo (E3); d=Bredevoort (E3) – exceptionally, Maurice allows his troops to plunder; e=Enschede (E4); f=Ootmarsum (E4); g=Oldenzaal (E4); h=Lingen (E4).
1598 a=Rijnberk (D2); b=Schenkenschans (D3).
1599 a=Bommel (Zaltbommel, C3); b=Las Palmas (Spain); c=Rees (D3), supporting German troops.
1601 a=Rijnberk (D2); b=Ostend (A2) until 1604; c='s Hertogenbosch (Den Bosch, C3).
1602 a=Grave (D3).
1603 a='s Hertogenbosch (Den Bosch, C3); b=Wachtendonk (D2).
1604 a=Sluis (B2).
1605 a=Oldenzaal (E4); b=Lingen (E4); c=Wachtendonk (D2); d=Krakau (D2), castle.
1606 a=Bredevoort (E3); b=Groenlo (E3, twice); c=Rijnberk (D2); d=Lochem (D3); e=Malacca (Malaysia).
1608 a=Utrecht (C3).
1609 Commencement of 12 Years' Truce.
1610 a=Gulik (D1).
1617 a=Gradisca (supporting Venice).
1618 Outbreak of 30 Years' War. a=Batavia (Jakarta, Indonesia).
1620 a=Wesel (D2).

Coalition War, 1621–48

1621 End of 12 Years' Truce. a=Gulik (D1).
1622 a=Bergen op Zoom (B2).
1624 a=Salvador de Bahia (Brazil); b=Breda (C2).
1625 Death of Maurice, succeeded by Frederick Henry. a=Goch (D2); b=San Juan (Puerto Rico).
1626 a=Oldenzaal (E4).
1627 a=Groenlo (E3); b=Batavia (Jakarta, Indonesia); c=Glückstadt (supporting Denmark).
1628 Capture of Spanish treasure fleet off Cuba, the proceeds of which will finance successful siege of …
1629 a='s Hertogenbosch (Den Bosch, C3), the last Spanish-held city on a major river in the north. Its surrounding swamps are drained according to plans by Jan Leeghwater, the foremost Dutch land-reclamation engineer.
1630 a=Recife (Brazil).
1632 a=Venlo (D2); b=Roermond (D2); c=Maastricht (D1).
1633 a=Rijnberk (D2).
1634 Offensive/defensive alliance with France. a=Borken (E3), supporting Protestant rulers; b=Maastricht (D1); c-Breda (C2).
1635 a=Philippine (B2); b=Leuven (C1), with France; c=Arryal (Brazil); d=Schenkenschans (D3).
1636 a=Porto Calvo (Brazil).
1637 a=Porto Calvo, again; b=Breda (C2); c=Venlo (D2); d=Roermond (D2).
1639 a=Gelre (D2).
1640 a=Galle (Sri Lanka); b=Gelre (D2); c=Malacca (Malaysia), with Johor and Aceh allies.
1641 a=Gennep (D3); b=Sas van Gent (B2); c=Sao Tome.
1643 a=Sas van Gent (B2); b=Thionville (French in alliance).
1644 a=Sas van Gent (B2); b=Grevelingen (Gravelines, French in alliance).
1645 a=Hulst (B2).
1646 a=Antwerp (B2); b=Venlo (D2).
1647 Death of Frederick Henry, succeeded by William II.
1648 Peace of Münster, an element of the Peace of Westfalia, ends both the 80 and 30 Years' Wars.

CAVALRY

Although most attention is usually focused on the infantry arm, cavalry continued to be the decisive weapon. During peacetime it policed territories; on campaign it reconnoitred routes and guarded convoys; and in battle it screened deployments, saw off enemy cavalry, and might rout enemy infantry. John of Nassau stated that the foundation of victory rested on strong 'shock' cavalry, and in fact most battles of the war were won or lost because of cavalry. The prospect of being charged by cavalry meant that it was always the infantry which adapted its weapons, tactics and formations to those of cavalry, never the other way around; the cavalry merely had to wait until infantry wheeled, or pikes wobbled, or musketeers ran in for cover, and then attack. When cavalry did adapt its ways, it was in response to technological or economic trends that affected them (e.g. development of pistols, or shorter available training-time, respectively).

The rebels' first victory at Heiligerlee (1568) was decided by the impetuous charge of Spanish cavalry, who fell for the trick of conspicuously wobbling rebel pikes. The most important States' victory of the 80 Years' War was Nieuwpoort (1600), one of the most decisive victories of early modern history; this was also won by cavalry. So were the States' last victories of the war, with cavalry by then supported by highly mobile infantry who were finally managing to keep up with them.

CIVIL WAR, 1568–87

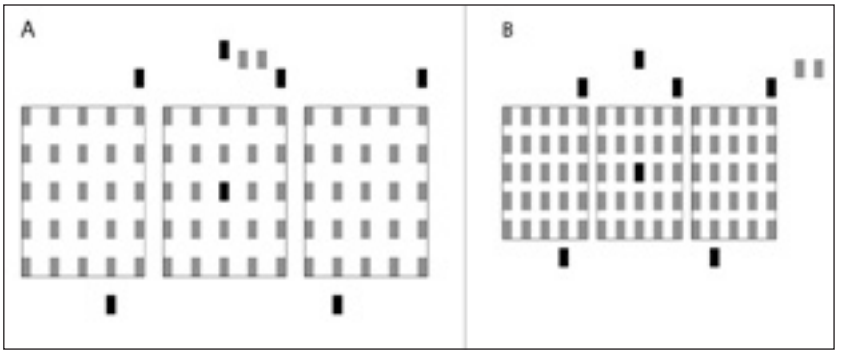
The rebel cavalry, or *ruiterij* ('ridery'), was a varied mix of organizations and equipment. Both England and France sent sizeable contingents to help the rebels, including cavalry. During the first couple of years most cavalry was paid for by the Nassau brothers, but financing was gradually taken over by provinces, and finally by the new state. In the Netherlands the term 'carabineer' started to appear instead of '(mounted) harquebusier'.

Organization

The smallest administrative cavalry unit was the company or 'cornet' (*vaan* in Dutch) of more or less 100 horsemen, and its tactical component sub-unit of more or less 25 was initally called a 'corporalship'. Rather than quoting the somewhat confusing contemporary variations throughout the period, in this text we have chosen to use the modern English terms 'squadron' and 'troop' respectively.

In the Low Countries squadrons were usually between 70 and 150 strong. The early war years also saw the last of the *bandes d'ordonnance* – mixed companies of lancers and mounted harquebusiers on a 1-to-2 ratio, typically with 90, 120 or 150 men. A squadron was led by a captain (*ritmeester*), a lieutenant, a cornet (junior officer), and often a pennon-bearer – these four being classed as officers – and two trumpeters. Many early squadrons that were raised locally were also mixed, often of lancers with either harquebusiers or pistoleers. Their

In addition to his well-known sequences of drawings of infantry drill, De Gheyn also depicted the States' cavalry troopers of the late 1590s. They usefully illustrate the transition from lancer to cuirassier-pistoleer, and from the cassock (as here) to the sash. This particular drawing emphasizes that the cuirassier's sword was not merely a secondary weapon. (De Gheyn, 1599; RM)



The States' cavalry squadron, from its reform in the 1590s until the end of the war, with three troops each of five ranks and five files. A unit's 'paper' strength was not noted in men, but in horses, including the extra mounts for its officers. (A) open formation, with 6ft (2m) gaps between ranks and files. (B) closed formation, with 3ft (1m) gaps.

Leaders are shown in black: the captain rides at front centre, with two trumpeters to relay his orders. Each troop is led at right front by a corporal. The cornet rides in the middle of the central troop (in Maurice's early days, in the second rank). Behind the squadron the sergeant ('quartermaster') rides on the left and the lieutenant on the right.

Larger squadrons might have more files, but – certainly after the 1609 truce – never more ranks. The formation could double its files to present a wider front, but the ranks were never doubled. During battlefield manoeuvres units often closed files and opened ranks. They could turn, wheel, and even pivot their horses and counter-march to turn the squadron back-to-front on the spot. (Author's drawing)

main purpose was to police the hinterland of provincial cities, and – to earn their living – to raid enemy territory. Similarly organized were the regimental 'guards' – the cavalry squadrons maintained by many infantry colonels under the terms of their contract.

French mercenary squadrons ideally had 100 troopers. German mercenary squadrons, like their infantry units, were usually much larger, between 300 and 400 men; these might be all pistoleers, or in mixed pistol and harquebus units. Although some colonels were appointed, no cavalry regiments were established as such. However, German mercenaries, often referred to as *reiter* (German for 'riders'), were regularly hired per regiment. The first rebel national field army of 1576 (in distinction from previous armies, which were either provincial or 'warlord' forces) had around 10,000 cavalry (25 per cent of the whole army), with roughly one lancer for every two mounted harquebusiers and two *reiter*; the old-style *bandes* provided half of the lancers.

In the field

Mounted harquebusiers fought like skirmishers, probing and softening up the enemy and protecting the flanks. They would keep up a continuous caracoling fire: riding up to the enemy, shooting and then returning to their unit, but without strict order. Many commanders expected them to dismount to fire if the circumstances required it. Lancers operated in sub-units of about 30 men, usually in two well-spaced ranks. They would walk towards the enemy and kick into a faster pace at 30 to 45ft (10–15m), so they would make contact at maximum speed and still in perfect order; at a slow pace their lance was useless. Several of these sub-units would attack in successive waves. Ideally, they would position themselves to charge the left flank of opposing cavalry.

German pistoleer units deployed in deep, closely packed formations, often with as many ranks as they had files. In his notes, John of Nassau states that only the front rank plus up to two other ranks could fight effectively. Worse, because all the officers were in the front rank except the cornet somewhere in the middle, the whole unit was hard to control. The low number of officers also made such troops useless for performing minor battlefield tasks in small detachments. On the other hand, it only required a few months to turn raw recruits with new horses into competent pistoleers, while it would take a couple of years' training to make decent lancers of them. If pistoleers were well led and experienced they could ride over any opponent; if not, a single lancer charge could rout them (e.g. Mookerheide, 1574).

Two steps from the cuirassier's individual weapon drill, with Dutch and English captions. Like De Gheyn's infantry drill drawings, these were meant to train the individual only, in this case in how to load his pistol. At unit level, the leader would give a single command, after which each trooper would perform all steps of the action ordered, in silence. (From Hexham, 1642; KB)

In France a middling approach had been developed. Their pistoleer units were 15 files wide, about the same as the Germans, but only six ranks deep, with the captain and cornet in the front rank, the lieutenant and pennon-bearer on the flanks, and a sergeant in the rear, which allowed much better control. Ten extra men acted as a 'forlorn hope' or reserve, or to take the opponent in the flank. French cavalry were highly valued by the rebel commanders.

To maintain order, pistoleers could only charge at a trot or at most a canter, but, unlike the lance, their pistols did not rely on speed for impact. Unconfident or raw pistoleer units might veer away just before contact, giving the impression that they were caracoling, especially if they (like lancers) charged by rank. A proper charge, however, involved the whole unit, using its momentum to pass through or 'thread' the files of the opposing unit. Against enemies who could not fire back, the first wave might of course use its pistols and turn away, so the next could charge into the disorder which their comrades' volley had caused. Just like the lance, the pistol needed to actually touch its target to be effective against armour.

The soldier's equipment

Lancers wore full armour except on the legs. The popularity of the pistol required breast plates and helmets to be shot-proof (another reason the lance lost favour was simply that it could no longer penetrate armour). Mercenary pistoleers and mounted harquebusiers might wear less armour, perhaps only helmet and cuirass. The last traces of horse armour were quickly disappearing, leaving the occasional (half-) chamfron or saddle steel (pommel and cantle plates). Blackening armour to prevent rust gained popularity, and most German mercenaries already did this.

Lances were 11–12ft (about 350cm) long, designed to break on impact. Mounted harquebusiers used wheellock carbines, with barrels about 3ft (90cm) long. All riders had a sidearm, typically a 3ft (90cm) broadsword, and at least one wheellock pistol (even the lancers); pistoleers carried at least two. The average pistol was still quite short, with a barrel some 12ins (30cm) long. Pistol holsters were initially both slung from the pommel on the left side, but towards the end of the period they started to be slung one on each side. The bullet bag, powder flask and spanning tool were either slung from the trooper's waist belt, or attached under or to the rear of the holsters.

Pistoleer and lancer companies wore uniform 'cassocks' (coats with false sleeves) beneath their shoulder armour. German mercenaries avoided such extra expense, but were recognizable by their blackened armour; however, as more units copied this, plumes and sashes became more important to distinguish friend from foe. Still without any clear convention about which colour to use, rebel troops in this period tended to choose orange-and-white, orange-white-and-blue or orange-white-and-green. Units were distinguished by both standards and pennons. Lancers would use the spearhead staffs offensively, but pistoleers held the flags upright by means of a holder on the right stirrup with a sling around the arm. Accordingly, it was considered shameful for lancers to return with their flag, and for pistoleers to return without it. Pennons were in the same colours as the unit's cassock.

WAR FOR INDEPENDENCE, 1588–1620

During the first half of the 1590s the whole army was reformed and drill introduced (see MAA 510). After an initial preference for lancers, Maurice of Nassau settled on cuirassiers (previously lancers and armoured pistoleers) and carabineers (previously harquebusiers). Following the same type of strict drill as the infantry, the States' cavalry developed into a manoeuvrable and controllable battlefield force. Foreign financing of units was no longer needed by the late 1590s; indeed, by then Dutchmen had to be recruited to keep English units up to strength. French cavalry, on the other hand, were always available, and sought-after; even Maurice's new bodyguard, a mixed double-squadron raised in 1599, consisted entirely of Frenchmen.

Organization

Wartime squadron strength varied when Maurice took over. In 1591 it was set at 120 horses, then changed to 100 from 1599. Each such unit included a captain, a lieutenant, a cornet, a sergeant (then called a quartermaster), two trumpeters (a third was allowed from 1602), three corporals, and – to be left in camp – a quartermaster (then called a clerk) and a farrier. The six highest ranking men together had 11 extra horses. Foreign troopers would be put in the same unit, commanded by one of their own countrymen. Up until 1595 Maurice increased the number of lancer squadrons, even converting carabineer and German pistoleer units. In early 1597, however, all lancers and three of the carabineer squadrons were converted to cuirassiers, marking the end of the lance in the States' army.

A major improvement pushed through at the same time was the addition of forage horses (called *bidets*) to cuirassier companies on

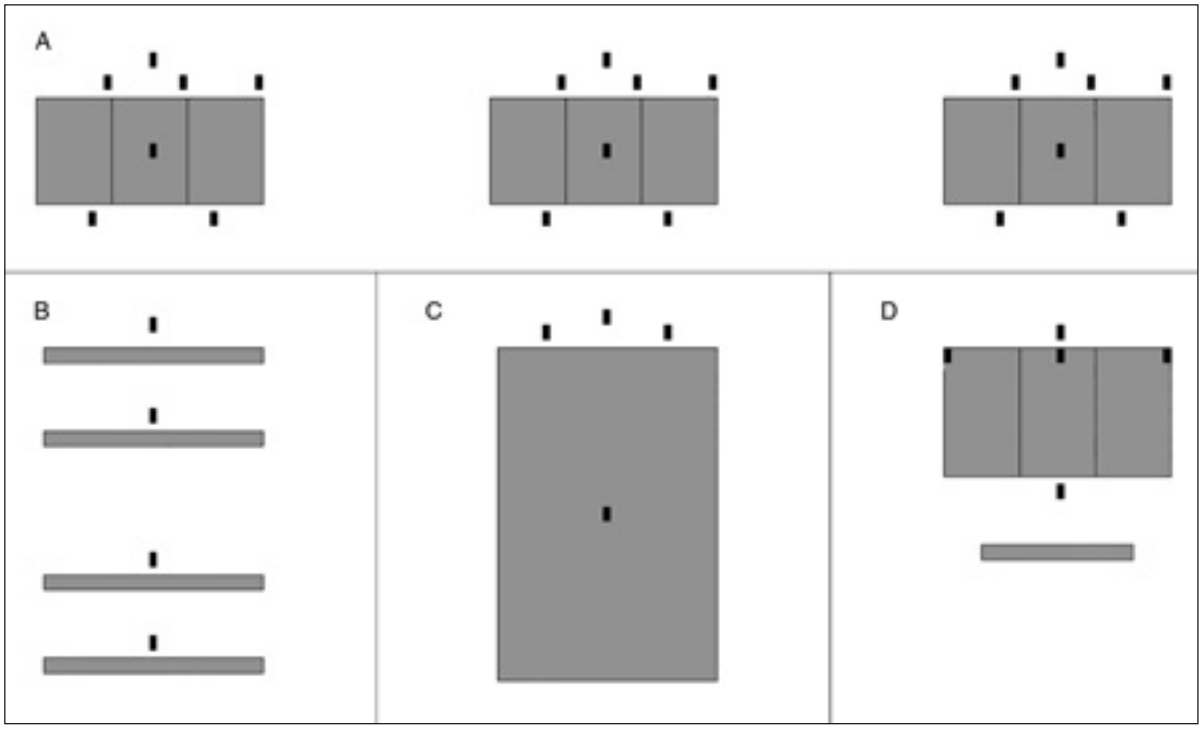
Larger cavalry formations compared.

(A) States' field regiment of three squadrons each of three troops, each troop 15 files wide by five ranks deep. The gaps are a whole squadron-width, to leave space to manoeuvre. The regimental commander, usually absent, is omitted.

(B) Typical early lancer tactics: widely spaced ranks of 15 troopers led by an officer, charging in succession.

(C) Squadron of German *reiter* pistoleers, with the same 15-man frontage as a States' squadron but also 15 ranks deep. This gives it the same number of men as a whole States' field regiment, but with fewer officers than a single States' squadron.

(D) The early French solution to the challenge of the pistoleers' momentum: the squadron of three troops is the same width but only one-third as deep, with the men of an extra 16th file drawn up in a reserve rank behind. This seems to have been the basis on which Maurice reformed his cavalry units. (Author's drawing)



Detail from engraving showing a mêlée near Den Bosch on 5 February 1600, between 20 French cuirassiers under Capt Pierre de Bréauté and 20 royalists led by Lt Gerard van Houwelingen, a notorious turncoat nicknamed 'Lekkerbeetje'. This famous action was a pre-arranged 'grudge match', wholly against orders, sparked by an insult following an earlier ambush. During the first charge Lekkerbeetje was killed but his men fought on, killing 14 Frenchmen and capturing five, including De Bréauté, while only losing five themselves.

Lekkerbeetje's commander Col Anthony Schetz, governor of Den Bosch, had the French prisoners killed, thus causing a feud that lasted for a generation. Eyewitnesses of the encounter wrote that the ranks 'threaded' or passed through one another, and that De Bréauté lost because he was too hot-headed to rally his men properly after the charge. (Doetechum after Vrancx, 1600; RM)

campaign, each with a servant. These would forage for the unit, sparing the warhorses for actual combat; this kept the units fresh, concentrated and ready for action, instead of strung out across many kilometres looking for fodder. At first 25 troopers per unit were appointed to each provide such an extra horse and servant, increased to 30 from 1602.

In 1588 the standing army had seven lancer and six carabineer squadrons, but by the time of Nieuwpoort (1600) this had grown to 33 units. When the 12 Years' Truce started in 1609 the States' standing army counted 33 cuirassier and seven carabineer squadrons, including Prince Maurice's bodyguard double-squadron and one other double- strength squadron. During the truce, all squadrons were reduced by a single 'corporalship' or troop.

In the field

On campaign, carabineer squadrons formed flying columns with dragoon companies (see MAA 510). On the battlefield, carabineers acted as skirmishers, cuirassiers as the shock force, but if circumstances allowed then carabineers too would not hesitate to charge. Squadron deployment closely followed French practice: six ranks of 15 files. In 1599 this changed to five ranks of 15 files. Each squadron comprised three equal-sized corporalships/troops of at first 30, then 25 troopers each (see diagram on page 7). These could march in column and quickly deploy next to each other to form line. Six ranks allowed a unit to easily double its files to occupy twice the frontage; though five ranks made this more complicated, doubling continued to be used. Each file had a leader who ensured order in his file, and sent men from his own file to make up losses in the file to his right. Shortages usually meant fewer ranks, but captains could also maintain the number of ranks by taking one file from each troop. John of Nassau notes that the number of both ranks and files should always be four, five or six (though they did not have to be the same). Units and sub-units would ride on the march close behind one another, with just enough space for the officers in between.

During campaigns, three or four squadrons were grouped into a field regiment, commanded by a sergeant-major (who gradually came to be

called 'major'), colonel or a higher rank. If a regiment deployed in line, its squadrons would maintain a gap of a full squadron's width between them, or around 50ft (15m). Over the years the same squadrons tended to stick together, sometimes for very long periods: one field regiment from 1610 was still campaigning together in the late 1630s.

Combat drill

Just like the infantry, the cavalry were drilled to act in unison, on command. For their formation alone they had 21 commands. In battle the trumpeters would blow the 'march', 'charge' and 'retreat'. The unit would start and stop as one, and could manoeuvre at a canter or gallop, but the preferred speed was a walk. Horses too were 'drilled'; riders had to teach their horse to obey commands given with the legs, reins and voice. Rider and horse should be able to pivot, move sideways, swim and jump, and repeated practice made the horses accustomed to the noise of battle.

Because of their longer-range firearm carabineers had a more elaborate drill, much like the infantry's skirmish drill (see MAA 510). Individually, they would gallop to the point where they had to shoot, fire their carbine to their left at a target (man-sized or smaller), then gallop away again to rejoin their unit. Firing was practised with and without halting. If a higher volume of fire was needed, the riders would do so by file, following each other closely at a trot, not a gallop, to and from the point of firing. For an even higher volume this manoeuvre could be performed by a whole troop. This caracole was practised often, with live ammunition, ensuring strict order and aimed shots. Carabineers had a similar drill for their use of pistol and sword: from as near to the target as possible they would fire

Stages in the evolution of the wheellock cavalry pistol during the war. As armour became thicker, it became necessary to actually touch the target with the muzzle to ensure an armour-piercing hit; John of Nassau recommended 'preferably under his armour, or on his visor'. For this a longer reach was necessary, hence the great increase in barrel length.

(Top) 1580s; barrel 12ins (31cm), calibre 0.6in (15mm).

(Centre) 1620s; barrel 14ins (34.5cm), calibre 0.5in (12.9 mm), weight 2.5lb (1,150gr). This pistol has safety markings to show whether or not it was ready to fire.

(Bottom) 1640s; barrel 20ins (50.5cm), calibre 0.5in (12.9 mm), weight 2.5lb (1,150gr). (RM)

their pistol to their right, without halting. The early large lancer squadrons probably charged in the old fashion, rank after rank, each to reassemble behind their unit – a kind of lancer-caracole.

With officers on all sides a squadron was more controllable, and Maurice's new drill also made it more manoeuvrable. John of Nassau states that immediately after a squadron had charged and passed through its opponent, it would about-face – each trooper pivoting to counter-march – and charge the same enemy again in the rear. Most likely that opponent would still be moving away, or collectively wheeling (a manoeuvre of which John strongly disapproved, calling it 'half a rout').

When cavalry charged cavalry it should be at a trot or perhaps a canter, since maintaining ordered cohesion was more important than speed. When charging infantry, however, the higher the speed the better (and no time should be wasted taking prisoners). This could have a devastating effect: at Turnhout (1597) just a handful of States' squadrons cut down more than 2,000 royalists in only 15 minutes. First contact would preferably be made with the sword, pistols only being drawn during the ensuing mêlée. However, if the opponent could not fire back, he might be shot into disorder first.

Drill also made the cavalry more dependable than before: previously the rebels had lost battles because their initially victorious cavalry failed to rally and return to help their hard-pressed infantry (e.g. Hardenberg, 1580).

A typical square-holed spanner to wind up a wheellock's mechanism. It has a screwdriver tip for field repairs, and a hole for a suspension cord. (RM)

The soldier's equipment

As marches and campaigns got longer and armour heavier many troopers preferred to leave some armour at home, but their equipment was strictly regulated in Maurice's new army. From 1596 on, cuirassier troopers required blackened armour consisting of helmet, gorget neck-guard, breast-and-back plates, shoulder and arm guards, a gauntlet for the left (rein) hand, a 3ft (90cm) sword and one pistol. Cuirassier officers and those troopers appointed to have the extra forage horse needed their helmet and cuirass to be pistol-shot proof. These men were supposed to fight in the front rank and – just like Maurice's pikemen – were therefore more heavily armoured, with extra protection on thighs and knees. They also had a second pistol for themselves, plus a pistol for the servant. Carabineers had to have an open helmet, gorget, breast-and-back plates and a carbine; a pistol was added in 1602 (both types of firearms were wheellocks). Heavy fines were imposed for missing pieces of equipment. Colonels, higher ranks and nobility were free to use more complete armour. Horses had to be stallions and (apart from forage horses) at least 15 hands high (5.3–5.4ft/160–165cm) at the withers.

Pistols, ammunition and tools were kept in holsters, one on each side hanging from the pommel. Pistol barrels had grown longer: pistols were now required to be 2ft (60cm) long, no doubt to make it easier to touch the target. This period also saw the gradual introduction of cartridges among cavalry: small paper bags for the proper amount of gunpowder and the ball tied in at one end. Another novelty was the distinctive crossbelt with a hook for the carbine that carabineers started to use. As before, cassocks were to be worn by all cavalry, but they fell out of use after the demise of the lance. At the battle of Turnhout (1597) the States' cavalry still wore cassocks; by Nieuwpoort (1600) they all wore orange

sashes instead, around the waist or over the right shoulder. Any plumes worn would probably also be orange.

COALITION WAR, 1621–48

The cavalry further streamlined its organization, tactics and equipment, just as the infantry had done. Cooperation between the two arms increased. French cavalry joined Dutch armies and vice versa in their new alliance. (In the rapidly growing overseas territories there was little use for cavalry – just a handful here and there, like the mounted police force in the West Indies in the 1630s.)

Organization

At squadron level the only major change during this period was that from 1623 on, every single cuirassier had to bring a forage horse and servant. Increasing numbers of carabineer squadrons were added to the army. Early in 1635 the government finally agreed to introduce regiments of cavalry, each consisting of four cuirassier and four carabineer squadrons, but these 'paper regiments' did not operate as tactical units; on campaign, squadrons continued to be grouped into the smaller 'field regiments' as before. Cuirassiers were highest in the pecking order. When Maurice wanted to appoint a carabineer captain to lead a cuirassier regiment, he first had to give him a cuirassier captaincy, because cuirassiers 'could not be expected to endure the orders of a carabineer'.

In 1625, when Maurice died, the States' standing army counted 67 squadrons: 41 of cuirassiers and 26 of carabineers. In 1635 this had grown to 80 units: 43 of cuirassiers and 37 of carabineers. By the end of the wars in 1648 the total had been reduced again to 69 squadrons. At times the cavalry was expanded with temporary forces. For example, in 1622 the States hired the services of Ernst, Count of Mansfeld, whose army included 5,000 cavalry. Although raw and ill-disciplined, their mere presence convinced the royalists to raise the siege of Bergen op Zoom. In 1632 the States hired 3,000 cavalry from Henry, Count of Berg, and these were incorporated into the standing army after a year. Still later, Swedes and Hessians were hired for an expedition to Luxemburg.

A lancer armour, missing only the left-hand 'bridle gauntlet'. Cuirassier armour was the same but for the absence of the lance rest attached here, and before 1623, under Maurice's regulations, the mid-rank troopers did not wear the thigh and knee armour. The weight of shot-proof helmets and cuirasses was exhausting: a man hired to walk in full armour at the head of Admiral Michael de Ruyter's four-hour funeral procession later collapsed and died. Nevertheless, a trooper was supposed to be able to mount his horse after a jog, pistols in hand. (RM)

In the field

Carabineers continued to form flying columns with mobile infantry. By now the army's pair of dragoon companies had been replaced with several regiments of infantry skirmishers, armed with flintlock and vaulting-spear (see MAA 510). Such task forces played a vital part in the victories of the last few years (e.g. Molensteeg, 1646). The number of

Closed and fully open views of a typical 'falling *buffe*' helmet of the period. The falling *buffe* started out as an extra piece strapped to the helmet, but eventually it was fastened to pivot, and the throat guard was also attached. Note the larger eye-slit than in a close-helmet. In an intermediate adjustment, only the top half of the *buffe* might be lowered. (Courtesy Peter Finer, Dealers in Antiques Arms and Armour, London)

ranks for all cavalry was firmly fixed at five irrespective of squadron size, probably by Frederick Henry after he succeeded to leadership of the Republic. In Henry Hexham's own Dutch translation of his *Principles of the Art Military* (1642), doubling of files continues to be part of cavalry drill. (Curiously, his original English text states that it was no longer practised, perhaps referring to the custom in England, as he does with regard to firearms). As the armies grew larger so cavalry 'field regiments' were grouped into brigades, just as in the infantry.

Although the walk and trot were the ideal battle speeds, States' cavalry continued to be a very agile force. For example, during the siege of Den Bosch (1629) cavalry charged a royalist relief force by jumping its fieldwork and the hedges around it, forcing it to surrender. The rapid increase in the number of carabineer units may indicate that their function was changing from primarily skirmish to primarily mêlée.

The soldier's equipment

Regulations did not change much, but from 1623 onward all cuirassiers had to be equipped like the designated front-rankers of before – i.e. the helmet and cuirass had to be shot-proof, the thighs and knees were armoured, and knee-high boots were now specifically mentioned. Buff coats under armour became more common. To underline their changing role, the 1639 regulations required them to have an extra pistol. Officially they now carried more firearms into battle than cuirassiers, but presumably cuirassiers' servants would hand their pistol over to their master when he went into combat. (Being unarmed did not stop these servants, however; during the siege of Bergen op Zoom in 1622 four companies of servants on their forage horses, each led by a cuirassier, performed a feigned charge on the royalist besiegers, armed only with sticks wielded as 'pistols'.)

Bullet weight was also regulated in 1623: for pistols, 42 to the pound, and for carbines 24 to the pound. In 1639 this was increased to 32/lb for pistols and 18/lb for carbines – the same weight as for the infantry skirmishers' flintlocks (matchlock muskets had bullets weighing 12 to the pound). The increasing weight of shot is illustrative of an arms-race between armour and firearms. Decades earlier, regulations had ensured that riders at least had the minimum necessary armament. Towards the end of the war the opposite happened: looking for every edge over opponents' arms and armour, well-to-do riders would invest in much more serious firepower than was strictly necessary. Single- or multi-barrel multi-shot pistols and carbines, either superimposed-load or 'turnover' weapons (see Plates H2 & H3), were acquired, and even blunderbusses were not uncommon. Still others preferred harder-hitting firearms, some supposedly shooting bullets as heavy as 6 to the pound. Snaphaunces were hardly seen among the States' cavalry (unlike in the English army, as Hexham notes). Flintlock pistols started to appear shortly before the 1648 peace, and the first flintlock 'revolvers' not long afterwards.

Armour continued to be blackened, and orange sashes and plumes were worn for identification as before. During night-time raids hats would be worn instead of helmets, with an appropriate field sign: not a white shirt as usually worn by infantry, but a white handkerchief tied over the nose and mouth.

ARTILLERY

During the first decades of the war field artillery seems to have played only a minor role on the battlefield, but commanders recognized its potential. Maurice, himself an expert artilleryman, used the 12 Years' Truce to reorganize, reinvent and greatly expand the army's arsenal, introducing mobile heavy field artillery and light battalion guns. From the previous ratio of one field gun per (large) regiment, the figure increased to five or more in the last decades of the war. At one gun per 200 infantry, this was a ratio that Napoleon himself would have envied.

CIVIL WAR, 1568–87

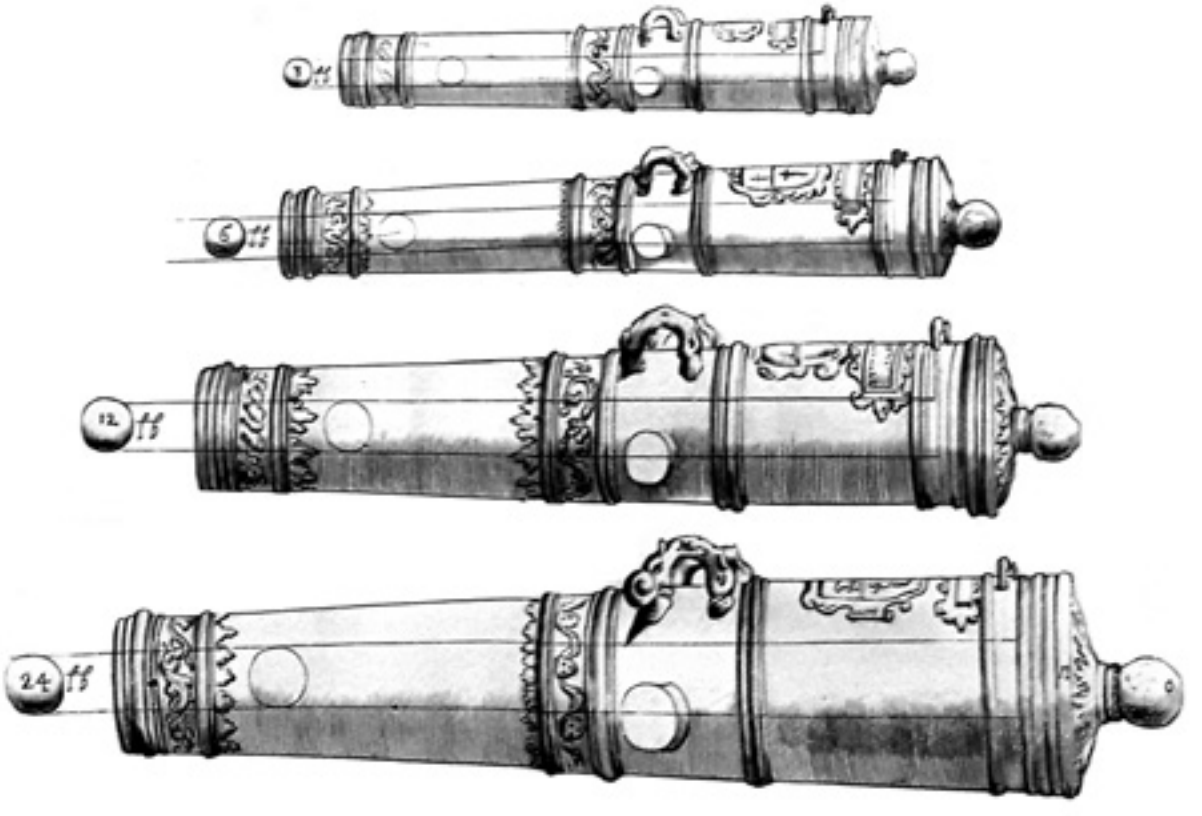
The chaos of this phase of the war, and the unreliability of the temporary and badly paid troops that made up the armies, was mirrored in the artillery. Ancient pieces might end up next to imported ones, or new guns cast locally by travelling master-founders – all to disappear the next day into some river, the hands of a victorious opponent, or the crucibles of someone else's temporary foundry. Most new and captured guns went to the navy or to cities.

Organization

During the reign of Emperor Charles V regulations had been introduced to limit the number of artillery calibres for both siege and battle. Once the 80 Years' War began the demand for cannon skyrocketed, and

Maurice's new class of field artillery: the shortened, lightweight 'drake' of the 1620's. (Top to bottom:) 3-pdr, 4ft (1.2m) long and weighing 300lb (150kg); 6-pdr; 12-pdr; 24-pounder. Even the 24-pdr was only 7ft (2.1m) long and weighed 2,250lb (1,000kg).

The 'cutaway' shape of the gunpowder chamber is incorrectly shown, probably on purpose: it was in fact conical. This secret was only copied in France in c.1700, as guns 'of new invention'. Their fame was such that foreign leaders would specifically ask to borrow or buy them from the States General. For example, Edward Cecil received some 3-pdrs for the Cadiz landing in 1625. They proved their effectiveness when just two of them, positioned in a house, shot up and threw back the Spanish attack on the re-embarking English infantry. (From Hexham, 1642; KB)



Type	Calibre in (mm)	Point blank ft (m)	Max. range miles (km)	Horses
48-pdr	7.5 (190)	1,250 (380)	3.3 (5.3)	31
24-pdr	6.0 (150)	1,000 (300)	2.8 (4.6)	23
24-pdr drake	6.0 (150)	450 (140)	1.3 (2.1)	5-9
12-pdr	4.8 (120)	750 (230)	1.8 (2.9)	11-17
12-pdr drake	4.8 (120)	350 (105)	1.2 (1.9)	3-5
6-pdr	3.8 (95)	1,000 (300)	1.9 (3.1)	5-9
6-pdr drake	3.8 (95)	250 (75)	1.2 (1.9)	3
3-pdr drake	3.0 (75)	100 (30)	0.4 (0.6)	1

Basic specifications of the guns of the States' field army from 1621 onwards. 'Point blank' is the range without elevating or depressing the gun; hitting a closer target with roundshot required depression. The 48-pdr was used only for sieges. The standard 6-pdr *valkonet* was the mobile long-range piece; reports often mention an army nearing an enemy town 'up to a falconet's shot distance'.

Only around half the number of horses shown here were needed if moving along dry, well-maintained roads. Before Maurice's reforms fewer horses were allocated per gun, equivalent to one type lighter in this table – e.g. 23 horses for a 48-pdr. (Author's table)

regulations went out the window: warlords, armies, fleets and cities all needed guns, and all managed their own arsenals, swapping and borrowing guns from every source. This resulted in a bewildering array of ordnance.

Nevertheless, most artillery trains consisted of a number of light and heavy fieldpieces, usually 4- to 6-pdrs and 8- to 18-pdrs respectively. Siege trains similarly had light and heavy pieces, typically from 20- to 48-pdrs, plus a few mortars. William of Orange's attempts to restore some order and create an arsenal failed, but in 1573 the rebels did establish their first magazine in Delft. The only other fixed organization were the *kanonniers* and *konstabels*: these were the gunners educated to use the artillery, ideally two per siege piece and one per field gun, with the 'heavy lifting' being done by unskilled labour. Most early rebel armies had roughly one field gun per infantry regiment.

In the field

On campaign noblemen were appointed as artillery commanders, to oversee placement and firing of gun batteries during sieges. Labourers and horses were hired to transport the guns and their ammunition. River transport was used where possible, and the sailors then often doubled as labourers once the guns had been landed. Although heavy guns were difficult to manoeuvre, John of Nassau notes that battles were sometimes won simply by the morale effect from firing them. Their main purpose seems to have been to cause disorder, especially among the slow, densely packed infantry units. Once targeted (or merely threatened), these would have to move out of the way to avoid being shot to pieces. John notes that the only solution was a very ordered withdrawal, something few units could manage. The usual response was a wheel, a disordered retreat, or even a trot away – exactly the confusion that opposing cavalry was waiting for.

The normal rate of fire was eight shots per hour, though an experienced crew could manage ten. However, after every ten to 12 shots the barrel had to cool down for an hour or so, draped in water-soaked sheepskins. According to John, most guns would be fired only four or five times during a battle. A 12-pdr recoiled one or perhaps two metres; to make it easier to maintain a gun's aim during sieges timber platforms were used, or carriages were tied into place (though this wrecked them from the recoil forces).

Equipment

Guns were either bronze or cast iron, often referred to as *metaal* (metal) and *goteling* ('castling') respectively. Bronze was around five times more

expensive, but could be recast: many a church bell ended up as part of a gun. Barrels were bored a bit wider than the size of their shot. Besides its material and the weight of its iron shot, other important distinctions were the length and thickness of a gun's barrel, the shape of its chamber, and how it was loaded. Every distinctive type had its own name. To make matters even more opaque, different areas used different standard units of measurement. In the field, guns had two-wheeled wooden carriages with iron connectors and strengtheners, provided with teams of several paired horses hitched to a smaller-wheeled limber pulled by a 'thiller' – a trained single horse between the shafts. A heavier piece could instead be taken from its carriage and put on a special four-wheeled wagon (*blokwagen*), which moved across country more easily. Riverine gunboats were also much used to carry (and fire) cannon. Gunpowder was used loose from barrels, or pre-measured into paper, linen or parchment cartridges. The variety of shot available was as diverse as the number of guns, especially during sieges. Dampened sheepskins were used to cover the touchhole and the gunpowder keg or bucket, and to clean and cool the barrel.

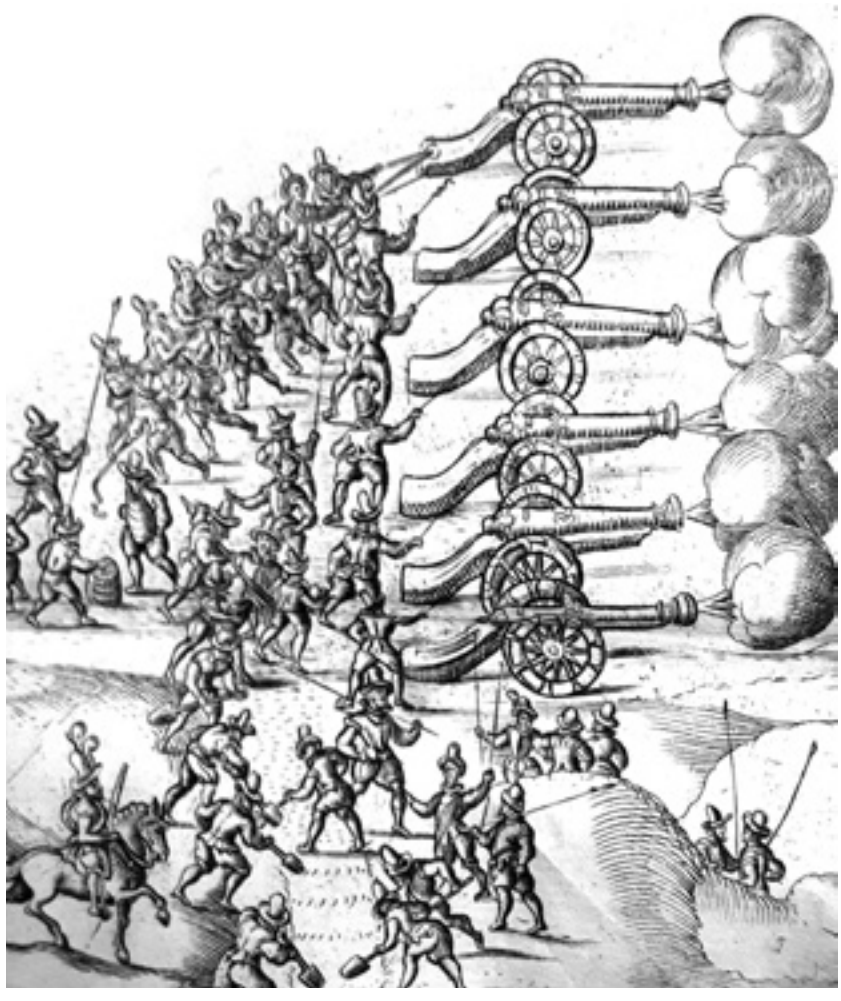
WAR FOR INDEPENDENCE, 1588–1620

Regulation was slowly introduced to the field army's artillery train. In 1589 the first foundry was created specifically for the army, in a former Catholic church in the The Hague. Ten years later the first regulations for the artillery arm were published. During the 12 Years' Truce, Maurice tested many theories and designs on The Hague's beaches. This resulted in several new gun types, specifically for use on the open battlefield.

Organization

The new regulations and proper bookkeeping created a detailed organization for the artillery arm, especially of its train (both by land and water). Standardization of guns took longer, and the army continued to borrow guns from the navy when the need arose. Every year during the long truce a fixed number of standardized guns were cast for the army. When the 'cold war' heated up again the States' field army had a full arsenal meeting these new standards – so full, in fact, that it could now afford to lend and even sell guns from its own stores. Gunners had to pass a practical exam to prove their expertise, and thereafter they were tested regularly. Mortar gunners were a separate breed, called *vuurwerkers* ('fireworkers'). Both types had a permanent commission, mainly serving the many guns in the frontier cities and forts, and by 1618 there were almost 230 such men on the States' payroll. For campaigns, temporary gunners were hired to man the guns in the field.

Throughout this period the number of field guns with a field army remained at around one gun per infantry regiment. Siege guns outnumbered field guns in campaign trains: a handful of 48-pdrs, a few mortars, but numerous 24-pounders. These could double as fieldpieces; although requiring many more horses and men to operate, these clumsy cannon nevertheless could be very destructive when deployed properly, thanks to the use of canister-shot. Even on the one-day forced march of 36km (24 miles) to surprise the Spanish at Turnhout (1597), Maurice hauled along two 24-pdrs in addition to two lighter fieldpieces. At



At the battle of Nieuwpoort (1600), Maurice deployed the few guns he had with him – 2x 12pdrs and 4x 24-pdrs – on the flank, where they mauled the royalist troops with canister. This engraving shows them being manhandled (top) and served, with pioneers (foreground) preparing positions so the guns would not sink in the sand. The noise of big guns nearby must have been quite overwhelming, since they could be heard 15 miles (25km) away. (From Hondius, 1624; KB)

Nieuwpoort (1600) he had two field guns and four 24-pdrs from the siege train; emplaced on prepared platforms, these wreaked havoc among the Spanish with their blasts of canister.

In the field

On the march, guns on carriages travelled loaded and ready for action. John of Nassau notes the impact of a gun's design on its use in the field: if a gun is properly balanced, its elevation can be adjusted with just one hand; if not, its crew need an extra four men. Artillery was still mainly for the siege, so logistics became more of a worry than handling. To withstand a six-month enemy siege a fort's magazine was supposed to contain 150 shots per 48-pdr, 600 shots per 24-pdr and 75 shots per fieldpiece. When the States' army was besieged in Bergen op Zoom in 1622, in just 72 hours it used up 26,000lbs (12,000kg) of gunpowder, which reportedly enveloped the city in dark clouds lit up by explosions, like a huge, continuous thunderstorm. Counter-battery fire was common during sieges. (At Ostend in 1602, for example, a smaller-calibre ball was seen to pass exactly into the muzzle of a larger (evidently, iron) gun which was already loaded. The sparks from the hit ignited the powder charge, firing off both cannon balls without any damage or injury.)

Equipment

Experience and experiments during the truce settled the States' arsenal on five weights of shot: 48-, 24-, 12-, 6- , and the new 3-pdrs, most in two classes (heavy and light), plus mortars. The light classes of gun were usually named *draak* ('dragon', but in English usage 'drake' – see below, under 'Coalition War: Equipment'). The heavies were the more traditional pieces. The 48-pdr was usually called *kanon* or *heel kanon* ('cannon' or 'whole cannon'); the 24-pdr *half kanon* ('demi-cannon'); the 12-pdr was the *veldstuk* ('fieldpiece', sometimes called a 'quarter-cannon'); and the final traditional piece was the long-range 6-pdr *valkonet* ('falconet'), or sometimes *veldslang*, taken along to 'welcome the enemy from afar'. The name *kartouw* was regularly used instead of *kanon*. The table on page 16 shows the basic characteristics.

All the testing had also revealed that the traditional iron connectors and strengtheners used in carriages were in fact so heavy that they caused the wood to buckle when firing. A new carriage design used standard dimensions relative to the weight of shot, with heavier wooden parts and lighter iron parts than before. This increased their strength and lowered both cost and weight, shaving almost 350lbs (150kg) off a 1,400lb (650kg) carriage. To allow it to operate more independently, a special carriage was designed for the 6-pdr *valkonet*. This had an integral box containing six balls, six cartridges and all necessary tools (shovels, axes, pickaxe, crowbar, gunner's tools), with some extra space left over. The long-haul *blokwagen* was improved by fastening the barrel directly onto axles which could turn independently of each other, thus greatly reducing the turning circle.

Charges, elevation wedges, even the size of wheels and tools became regulated. For example, the length of a gun's copper powder ladle had to be three times the diameter of its ball, and the wheels' rim as wide as its ball. The carriage added around 20 per cent to the weight of a gun. As before, it was pulled by a limber which had a single shaft horse and several pairs of team horses. The prepared cartridge (*kardoes*) became the usual method for loading gunpowder in the field. At 400ft (120m), a 48-pdr ball would penetrate more than 23ft (7m) of sand, and half that of compacted earth as used in field fortifications. The canister became the second most numerous type of ammunition in stores, usually one canister for every two roundshot.

Mortars, both bronze and wood (the latter with an iron chamber, and mainly used for incendiaries) fired all kinds of shells. Judging their propellant charges was left to the 'fireworker', because even a little too much might rupture the thin-walled shell inside the barrel. Effective detonators had been developed under Maurice, thus solving the problem of unreliable fuses. John also mentions incendiary (including waterproof) and illumination rounds. Among other less visible refinements was the addition of iron (some say steel) touchholes to bronze guns to stop the holes expanding from continuous siege firing, when expansion to as wide as 4ins (10cm) was not unknown.

COALITION WAR, 1621–48

With Maurice's introduction of the smallest 'drakes' (see below, 'Equipment') the true 'battalion gun' was born. Drakes of various calibres remained the most numerous artillery pieces of the States' field army

during the Coalition War. There were many other inventions, including poison-gas and smoke rounds for use during sieges, but only the most practical were pursued.

Organization

Standardization of the field army's arsenal was completed by the time the war reignited. Right from the beginning, every 500-man infantry 'division' (the name then given to the basic infantry manoeuvre unit – see MAA 510), even those serving outside Europe, was assigned two battalion guns. These were usually the new 3-pdr *kleine draak* ('small drake'), *veldstukje* ('little fieldpiece') or simply 'drake', while the 6-pdr drake was known as a *grote draak* ('great drake').

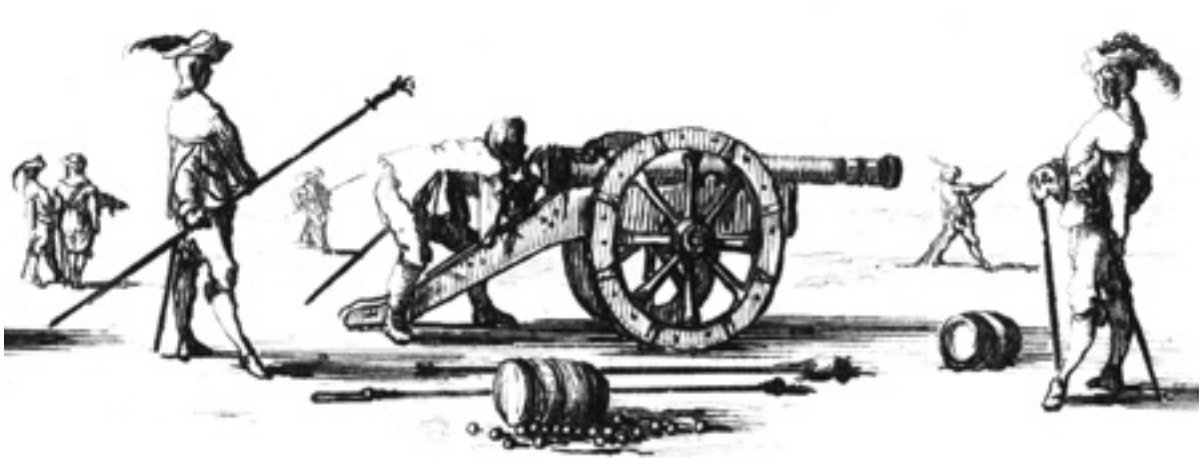
Despite the growing number of guns in the army, no administrative attempt was yet made to organize them further into companies, although gun types were grouped by the half-dozen for marches. The number of professional artillerymen kept pace: in 1631, for example, the field army counted one master petardier, two battery masters, three master fireworkers, 24 'noblemen of the artillery' (battery commanders – at a soldier's wage, probably the lowest paid job for a nobleman in the army), 85 permanent and 28 temporary gunners. As the scale of sieges grew so did the number of mortars: at Den Bosch (1629) the States' army used 15 of them. A field army of 1622 counted 15 infantry regiments and 6x 12-pdrs, 18x 24-pdrs and 50x small drakes. This preponderance of 24-pdrs and small drakes continued throughout this period, the former often with equal numbers of traditional and short-barrelled pieces (24-pdr drakes).

This might be a scene from the beach at The Hague where, during the 'long truce', aspiring gunners had to prove their skills, and Maurice experimented with his gun designs. The same site was also used to test other promising inventions submitted to the government, like John Hoevelmans' 1610 field periscope, and William Douglas' double-barrelled artillery, with which 'you can give off five shots in the same time someone else does two'. Some of these inventions received a patent, but most were rejected; however, a promising inventor often received a reward anyway, perhaps to guarantee confidentiality. Douglas, for instance, was rewarded with command of the company of the recently deceased Walter Bruce. (Della Bella, *c.* 1640; RM)

In the field

Of all the horses drawing a gun, the 'thill' horse between the limber shafts had the most important and demanding role. They were easily hurt when a travelling gun skidded, so to save these valuable horses an extra 'thiller' was added to each limber, tethered so that it was not pulling any weight, to be exchanged at intervals.

When firing at infantry a gunner was supposed to aim at waist level, to mow down a whole file or rank. John mentions that the lightened 24-pdr drake (see below, 'Equipment') could keep pace with the infantry on the



battlefield using just four horses. Preferably they remained hidden behind the infantry until the moment when they could spray their canister. He says that a well-managed 24-pdr drake could cause more damage than a badly managed infantry regiment. They might be deployed on the army's flanks, or within brigade-level formations. By contrast, pairs of small 'battalion' drakes supported individual 500-man divisions, often being deployed in the intervals between them. Though they were designed for the field, small drakes were also practical during sieges, being used to suppress enemy troops shooting from behind breastworks.

Equipment

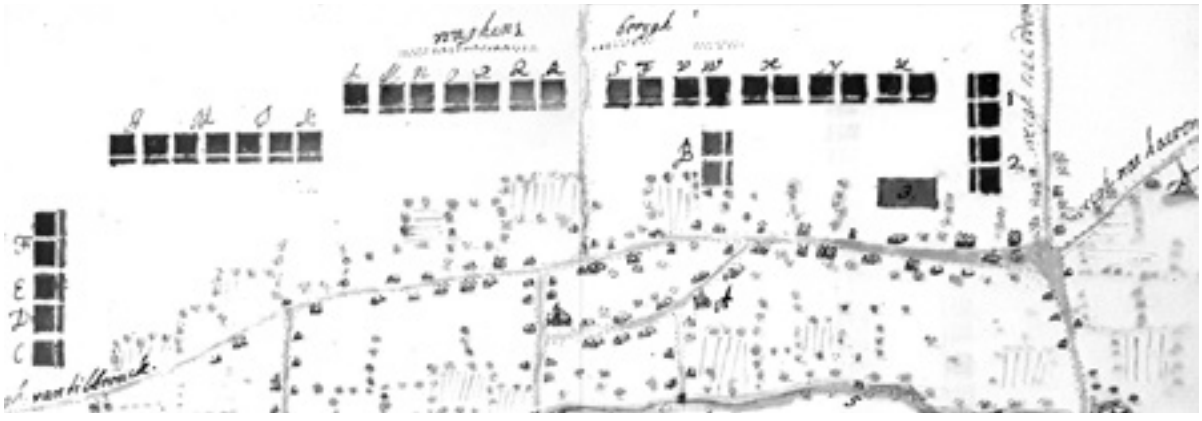
Maurice was well aware of the devastating effect that 24-pdrs could have in battle, but the problem was their weight and lack of mobility. Early experiments on the beach at The Hague had shown that lightening them by shortening the barrels by 2ft (0.6m) did not affect the battlefield range. On the other hand, the smaller mass of metal overheated quicker, and took longer to cool down, so with standard powder charges their overall rate of fire would be quite low. Other experiments provided a solution: smaller charges still gave effective range, so shorter-barrelled guns could maintain the same rate of fire.

Maurice then developed new, thinner and drastically shorter barrels with conical powder chambers, known collectively as 'drakes' whatever the calibre, though the 12- or 24-pdr drake was also referred to as a *kamerstuk* ('chamber piece') – see page 15. These were much lighter and cheaper than traditional guns; for instance, a 24-pdr drake weighed the same as a normal 6-pdr, while costing only a third as much as a normal 24-pdr, and needing fewer than half the number of horses. John says that if they could not use canister (presumably because the target was too distant), then hollow balls should be used for similar effect. The 12- and 6-pdr also received the 'drake treatment', and Maurice went one step further by introducing a very light 3-pdr drake that only required one horse or four to six men to move it. This fired either roundshot, or canister containing 30 to 70 musket balls. Whereas the 24-pdrs were an 'army asset', these 3-pdrs were ideal to accompany individual infantry units.

ENGINEERING

The 80 Years' War changed the craft of war into a science, and this is perhaps best illustrated by the development of field engineering. The problems facing commanders did not differ much between the beginning and the end of the war: rivers always had to be crossed, cities had to be secured, camps protected and fortifications overcome. Yet the early approach differed vastly from the later resources and techniques.

When William of Orange had to cross the Meuse in 1568, his opponents guarded all known bridges and forts. Eventually William found a suitable ford for his 8,000 cavalry, but the current was too strong for his 18,000 infantry. Instead of looking elsewhere or building a bridge, he improvised: he ordered a few hundred cavalry to wade into the river and form a living dam to break the water's speed, so the infantry could cross safely in their lee.



A hand-drawn and lettered map of the States' army camp in 1642 near Oisterwijk, south-east of Den Bosch. It shows both the high standard of detail on the army's maps, and the level of organization of the layout of camps, copying the ancient practices of the Roman army. The original is in colour; a separate table lists the key letters and the unit each represents. (anonymous, 1640s; KB)

Some 25 years later, when Maurice was seeking to impose order and control in his army, engineering offered him a perfect platform. Every engineer had his own ideas on how to lay a siege; to remedy this, in 1604 Maurice asked Simon Stevin, the leading mathematician, to design a 'blue print' for future fortifications and siege works. Stevin had also introduced bookkeeping to the army, allowing budgets to be set. Combining budgets, standardization and known attrition rates meant that the outcome of sieges could be more or less calculated.

Field engineering

From the start of the war the army hired pioneers. Their function was to travel ahead of the army, usually accompanied by cavalry, to clear the road of obstacles thrown up by the enemy (*abatis* and the like) and repair the surface, while others would follow behind to block roads against pursuit. Pioneers also helped prepare the battlefield, for example by covering ditches (Noordhorn, 1581, while actually advancing) and/or creating gun platforms (Nieuwpoort, 1600). At first such work parties were organised *ad hoc*. From 1574 onward prisoners of war and drifters started to be organized (and paid) to work as pioneers, in companies of 50 to 100 men, for the duration of a campaign. The first colonel was appointed in 1584. A pioneer company consisted of a captain, a lieutenant, an ensign, a sergeant, two corporals, a drummer, a provost and a clerk, plus 50 or more pioneers hired on a purely temporary basis.

Although most pioneer work was done by men hired to travel with the army, sometimes locals had to help out, especially to save their own town; this shows a woman at work in the defences during the siege of Bergen op Zoom.

Women contributed in many other ways; for example, at Bergen op Zoom they made small recoil-cushions for musketeers' shoulders to lessen the discomfort of prolonged firing. There were also many instances of women acting as messengers and spies. (Lons, 1622; RM)

Two *Friese ruiters* (*chevaux de frise*) chained together, with some caltrops in the foreground - the 17th-century equivalent of a barbed-wire entanglement. Interestingly, before the 1609 truce the term referred to spears with metal tips on both ends (like the 'swine feathers' of later Swedish fame), but later it meant these beams drilled with holes to take Xs of wooden stakes. (From Hexham, 1642; KB)

During the 30 Years' War many fugitives from Germany were employed.

Armies would try to situate their camp or battlefield position with flanks protected by terrain or wagons. Under Maurice these aspects also became regulated and standardized, and with good reason: on several occasions camps of both sides had been overrun by unexpected attacks. In 1600 Maurice appointed the mathematician Stevin to direct the construction of army camps. After reaching a new location, a regiment would be shown where to start digging and setting up huts according to Stevin's plans, and drummers had a special signal to summon the men for this task. Even an overnight camp had to have a ditch 3ft (1m) wide and 4ft (1.2m) deep, preferably with a palisade (a clear echo of the ancient Roman marching camp). In the 1630s the army train carried 60,000 pointed stakes for this purpose, each around 4ins (10cm) thick and 6ft (2m) long. Another quick defence were Xs of spears stuck in the ground, called *Friese ruiter* ('Frisian riders', *chevaux de frise*). As a ready-to-use alternative, two-wheeled carts fitted with six spears could march with the army and be swiftly deployed; in 1644, 800 of these carts were sent to assist the French army on its coastal campaign in the Spanish Netherlands. When these standard means were not available local commanders continued to improvise, as on Sao Tome in 1641; there six big anchors were hauled ashore and put in front of the artillery to shield it from enemy fire.

Bridging

With so many rivers in the Low Countries, it was almost impossible to conduct a campaign without making several river crossings. Bridges and fords were vital, and in the early period armies might have to march many extra miles looking for an intact or undefended crossing. Early remedies were time-intensive (building a new bridge), or too hit-and-miss (e.g. William's 'horse dam'). During sieges, ships were often used to create bridges or dams. This was taken a step further and formalized by Maurice into a pontoon and bridging train travelling with the army, making it independent of fords and bridges. At the end of the war the train had 12 pontoons, each on a wagon which also contained all the planking and materials for bridging, drawn by a team of 31 horses. These were meant to span narrow waterways and were strong enough to carry a field gun. For wider rivers a fleet of ferries and small vessels was available to quickly form a bridge-of-boats.

A bridge-of-boats over the Meuse at Grave, 1622. A pontoon train and a bridging fleet freed the field army from the limitations of finding bridges and fords, and from potentially costly battles to take or hold them. The river vessels measured 50 x 10ft (15 x 3m) for the Rhine and Waal, and about a third of that for the Meuse. Like pontoon wagons, they carried all the planking and materials needed, and each had a crew of around four men armed with wheellock, snaphaunce or spear. Once the bridge was assembled the crews would hold the fieldwork bridgeheads at both ends and a guard house in the middle. Several gunboats would also form part of such a fleet. When not on campaign, most of these vessels would be laid up in Holland except for the gunboats and armed ferries, which remained ready for action at key cities along the border. (Liefrinck, 1622; RM)

The siege

Sieges played a major role in the 80 Years' War. They decided who controlled cities, through which people, supplies and income flowed. Sieges did not make field battles irrelevant, as some historians claim (witness the many battles fought as part of a siege campaign), but they could reduce the risks of operations by making the course and the costs of a campaign more controllable. Many soldiers spent whole campaign seasons stuck in a trench or behind a breastwork; the longest sieges were Rijnberk (1586–90) and Ostend (1601–04). Deliberate flooding of the countryside was a proven method to keep an attacker at bay, but as the scale of sieges grew, so did the scope of the engineering; swamps were pumped dry (Den Bosch, 1629), and even rivers were diverted (Breda, 1637).

A besieging army had to protect itself from both the city (with an inward-facing line of contravallation), and from enemies marching to its relief (with an outward-facing line of circumvallation) – yet another lesson from the classical texts. Constructing these fieldworks took precious time, during which the besieger would be distracted from defending himself effectively. Maurice sometimes gave up sieges because an enemy relief army turned up too soon (e.g. Groenlo, 1595). Frederick Henry mastered the feint-by-march, sending his opponent in the wrong direction to earn him extra days (e.g. Hulst, 1645).

One advantage of the drilled army was its discipline, turning the States' soldiers into obedient diggers. This greatly increased the speed of finishing the inward and outward defensive lines. For example, at Breda (1637) 250 men from each regiment (5,000 in total) shovelled away to create the first version of the line, each man constructing 12ft (4 metres). Once the initial stage was ready the army deployed for battle, and 4,000 workers were brought in from Holland to finish the job. With the army secure, the slow work of approaching the city started.

Gun batteries were placed, and both sides would organize assaults. Meanwhile miners would be busy underground, tunnelling towards some weak spot to plant huge amounts of gunpowder to blow a breach in each other's defences. The first miner (*mineur*) company was established in 1588; it eventually had 100 men, including a captain, four corporals and a drummer. By 1600 five miner companies were on the army's payroll. 'Petardiers' played their part by blowing up gates or collapsing mines by means of petards – self-contained explosive munitions in metal cases.

The biggest obstacle to cross during an assault was the moat. Many inventive solutions and devices were constructed for this task by both sides, especially during the 1580s–90s. The easiest means was the fascine; Maurice standardized this into 10 x 6ft (3 x 1.8m) elements made of cork. Frederick Henry later replaced these with wicker baskets covered with waxed canvas, 6 x 2.5 x 1ft (1.8 x 0.8 x 0.3m), each carried by two men. Everything was regulated, even the size and number of gabion earth-baskets and sandbags.

Trench warfare

As the use of trenches and mines became common and formalized, so did the amount of fighting in and around them. Explosive shells had become so numerous and effective that men could only survive by living in dug-outs (e.g. Schenkenschans, 1635). In tunnels, trenches and breaches the fighting was much closer and bloodier than on the field, spawning new weapons, equipment and tactics, especially after 1620.

(continued on page 33)

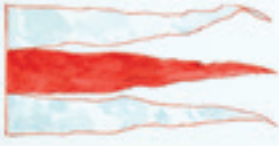
1

2

3

4

5



6

7

8

9

10

11

12

13

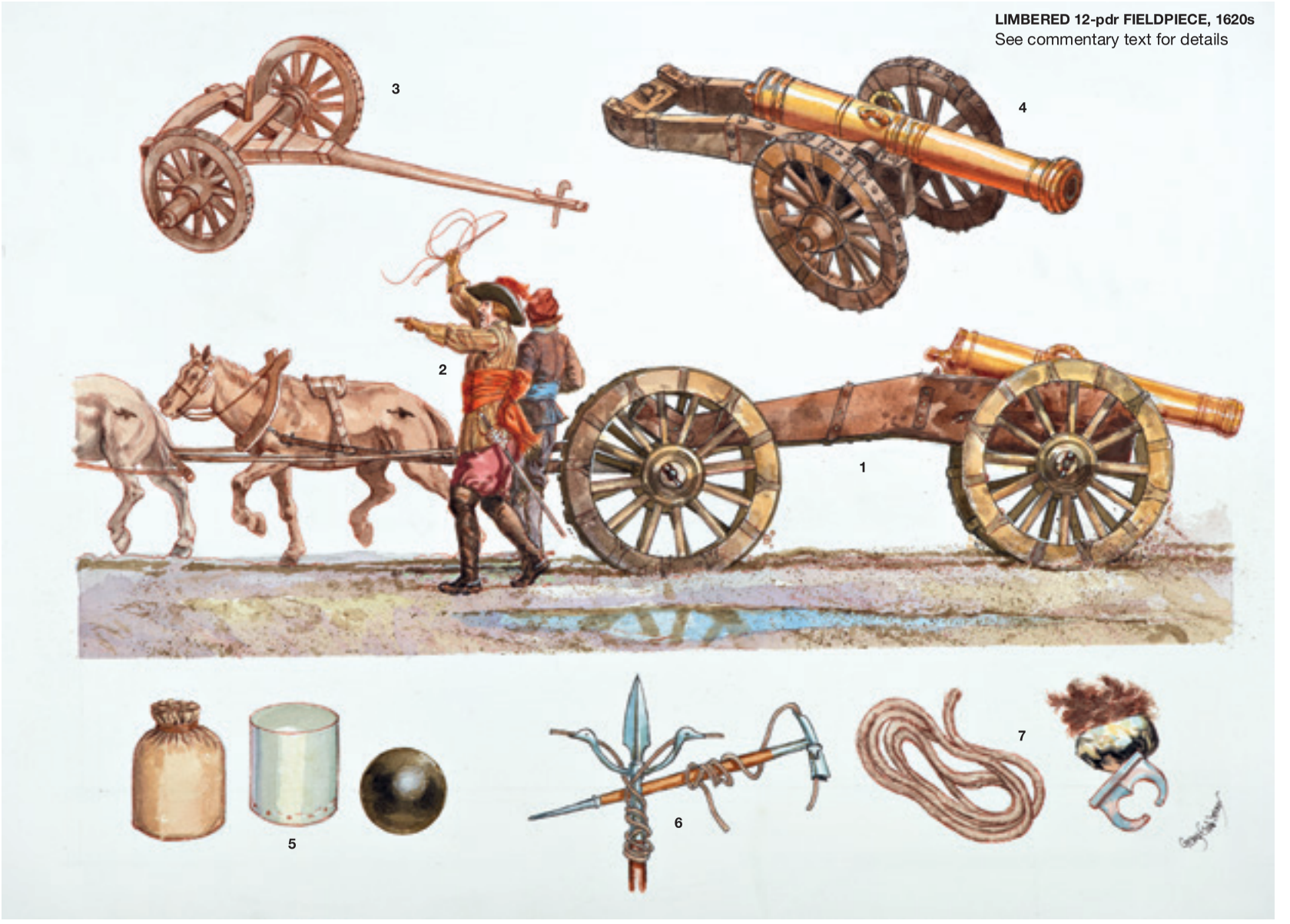
PENNONS, CORNETS & BANNERS
See commentary text for details

CIVIL WAR CAVALRY, *c.* 1580
1: German mercenary *reiter* pistoleer
2: Lancer, Pierre de Voisin's *bande*
3: Harquebusier, Van den Tempel's squadron

CIVIL WAR CAVALRY, *c.* 1580
1: Lancer, unidentified Dutch unit
2: Pistoleer, William of Orange's Guard
3: Michiel Caulhier

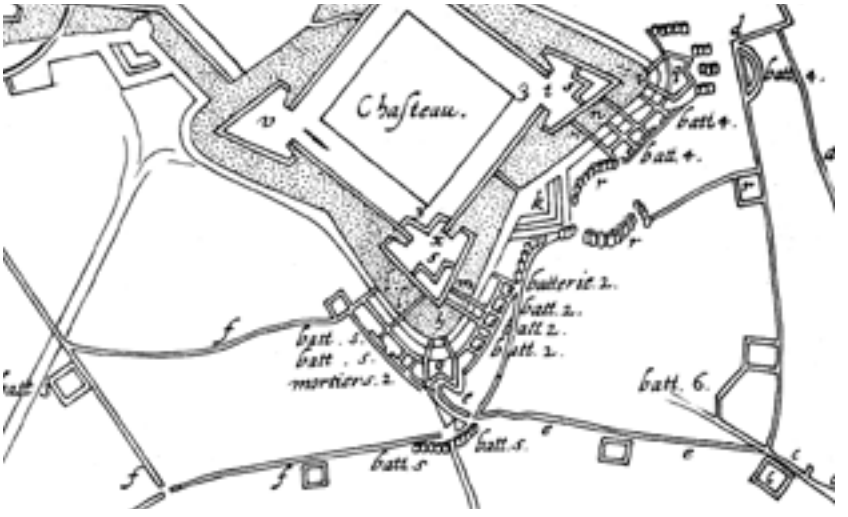
WAR FOR INDEPENDENCE CAVALRY, *c.* 1600
1: Cuirassier, middle ranks
2: Cuirassier officer, front rank
3: Carabinier

COALITION WAR CAVALRY, *c.* 1640
1: Trumpeter
2: Carabineer
3: General in cuirassier armour


LIMBERED 12-pdr FIELDPIECE, 1620s
See commentary text for details
1
2
3
4
5
6
7

BATTALION GUN, 1620s
See commentary text for details

IN THE TRENCHES, 1630s
1: Engineer
2: Miner
3: Sergeant grenadier
1
2
3



Another example of the meticulous cartography available to the army – a detail from the siege map of Gulik in 1621, typically showing all the trenches, fieldworks, batteries, units and approaches. The complete map naturally includes a key to the markings, and a scale measure. (From Hondius, 1624; KB)

Interestingly, many of the solutions then adopted were rediscovered in the 20th century. Period biographies mention the equivalent of 'Molotov cocktails', icepicks, pitchforks, spiked clubs, flails (a violation of the conventions of war, according to one author), many pistols, and, as late as 1602, a whole company fighting with two-handed swords. To be better protected from the close-range fire miners and sappers might wear shot-proof armour. Maurice ordered special shot-proof bucklers to be made with a vision slit, to protect men peeping over the parapet.

One interesting development was the emergence of the hand grenade. These were used at Steenwijk in 1592, and their numbers rapidly increased. Many new banners in the 1620s showed hand grenades as the main motif. In the 1630s, a properly stocked fortification for 3,000 men was supposed to have 1,200 hand grenades of 5lbs (2.5kg) weight. During the siege of Ostend (1601–04) the States' army grouped together grenadiers, often sergeants, to precede an attack. John of Nassau even proposed to create small grenadier units of 30 to 40 men on the battlefield.

Ruses and feints, some of them worthy of Hollywood commando movies, were commonly employed by all sides during the long war. It is fitting that Maurice's career, inspired by the classics, should have begun with the use of a 'Trojan horse'. In 1590, when he was only 23, he captured Breda partly by smuggling in soldiers concealed in a peat barge (middle right). The town had no particular strategic value, but it was one of his family's many hereditary possessions; perhaps that was why the Spanish made such a celebrated event of its recapture after a siege in 1624. Maurice's half-brother and successor Frederick Henry won it back again in 1637. (Hogenberg, 1590–92; RM)

Engagements might involve as few as four men, if two opposing tunnels met underground, or during commando-style tunnel raids to try to capture the gunpowder kegs from an opponent's mine. Usually special combat teams were organized. At Ostend, for example, demolition task forces consisted of a dozen or so men, preceded by a lieutenant and four grenadiers, and followed by a nobleman of the artillery, a master fireworker and eight gunners. A typical assault force of the 1630s, ready to go 'over the top' and 'into the breach', was exemplified by one at Breda in 1637: the first wave consisted of the storming party to take and hold the breach, with a lieutenant, a sergeant, four grenadiers, and 50 skirmishers with flintlock and vaulting-spear. These were followed by a supporting force of a lieutenant, a sergeant and 50 men, half pike, half musket. The second wave was the breakthrough group, a full company of musketeers and pikemen, supported by 80 pikemen under two sergeants. The third and final wave was the remainder of the assault force, followed by a workforce of 100 men to consolidate the ground captured.

Quite often 'mini-sieges' took place, with one or more companies per side fighting viciously for a small, isolated guard position which might change hands several times in a single day (some siege positions even had individual moats with drawbridges). A company might be ordered to carry out a bloody assault for no other reason than to test the opponent's resolve (again, shades of World War I). The more impetuous troops might lose their heads now and then, and charge for no other reason than sheer frustration; the most prone to such ill-advised actions were Scottish mercenary units and *ad hoc* groups of boisterous young French noblemen. No matter the reason, this kind of close combat in a confined space was fought without mercy: quarter was neither expected nor given. Sallying troops returning to their own lines might even find the gate shut in their faces if their pursuers were too close.

At the other end of the scale were mines (the munitions, not the tunnels): these contained many thousand pounds of gunpowder, and could be devastating. For example, during the 1585 siege of Antwerp one floating mine killed 1,000 royalists with a single explosion, obliterating entire companies without leaving a trace. After the dust of an assault had settled, a temporary truce might be requested by drum, in order to remove the casualties.

THE ARMY

Command

There was logic in the command structure of most armies, but less so in the titles of commanders. There were generals, lieutenant-generals, sergeant-major generals, quartermaster-generals, generals of infantry, of cavalry, of artillery; there were field marshals; there were generals who had the rank but not the title, and more. Eventually, above all of them would be the one or two remaining captain-generals, the title reserved for the *stadhouder* (the military and civic leader of a province). But even they had to bow to the States and their committees of representatives, who accompanied the army on campaigns (though never interfering during battle). To confuse matters more, commanders might also be

princes, dukes, counts and barons, all expecting the seniority and respect due to their noble rank.

Higher commanders could dress any way they wanted, and usually showed off their stylishness and wealth. Maurice was an exception, invariably dressed soberly in black. Few commanders seem to have followed the regulations which suggested that they wore more armour than their men. Many of them, including Ernst Casimir of Nassau and his son Henry Casimir, were killed as a result. Extravagant plumes marked those commanders who did wear helmets. Doing so saved Louis of Nassau's life at Nieuwpoort in 1600, when – surrounded by the enemy – he was rescued by friendly cavalry troopers who recognized his plume.

It is frustrating that space does not allow us to reproduce any larger this wonderfully detailed illustration. It shows Maurice's army marching across country over the plains of Brabant in 1602, divided into three parallel, self-sufficient columns. The units march in battle order (though here shown in stereotypical, unhistorical formations), guarded by cavalry on the flanks and followed by their wagon trains. Under magnification, every unit can be seen to be labelled with the name of its commander or its nationality (*Duijtschen* for Germans, *Engelschen* for English, *Gaerden* for guards, etc). Also identified are the senior commanders (Maurice, beneath a tree at lower left, is *Zijn Excelle,* 'His Excellency'), and even some heroic junior officers such, as the pioneer Capt Mijsenaer at bottom left. (Cornelisz, 1603; RM)

Movement and deployment

From the beginning of the conflict both sides spent a lot of effort mapping the country for military purposes. Under Maurice and Frederick Henry, surveyors would accompany the army on campaign. Detailed maps of cities, fortifications and regions would be kept secret, specifically for the military. Throughout the war the average marching speed was around 10 miles (15km) per day, but several forced marches saw this figure doubled or more, like the 24-mile (36km) march to the battle of Turnhout in 1597.

In the field, normal deployment placed infantry in the centre and cavalry on the flanks. Artillery was initially grouped along the front, later put among the infantry (see page 38). Generally, a fire-fight would commence at around 150ft (50m) range, first between any skirmishing screens, then between the main units. Cavalry usually manoeuvred at a walk, and when charging it ideally started its trot or gallop no closer than 45ft (15m) from its target. Infantry in close formation advanced foot by foot, only doubling their speed at around the same distance. If receiving a cavalry charge, drilled infantry might hold fire until that last 45 feet. Officers led from the front, and captains and ensigns were usually among the dead and wounded if their unit suffered any casualties. Higher commanders were supposed to stay well clear of the enemy, and with good reason: many of those that did not fell or were captured.

Civil War, 1568–87

No matter the size of the army, the rebels invariably deployed in a short line of one to three infantry blocks, screened by a large 'forlorn hope'

OPPOSITE
Armies on campaign needed vast quantities of bread and beer. In 1624, for example, 10,000 men required 2,500x 8lb loaves of bread and 100 large barrels of beer every day (a soldier's daily ration was several pints). A decade later, the army took along 100,000lbs of hardtack biscuit in 100 chests on 100 wagons, in addition to the bread and 120 wagons of beer. Armies would carry mobile mills and ovens to bake bread in the field. Besides food and drink, the men had one baggage wagon per infantry company. Additionally, each regiment had one ammunition wagon, carrying four 170lb barrels of gunpowder, two 130lb barrels of musket balls (around 3,000 balls in total) and two 50lb bundles of matchcord. (From Van Berkenrode, 1600-02; RM)

selected from the blocks, with a handful of cavalry units on the flanks. Reserves were hardly used; instead commanders seemed to prefer to use any extra men to extend the line, or to create an ambush. Although battlefield ambushes were the norm rather than the exception (e.g. Heiligerlee, 1568, and Hardenberg in 1580), a surprising number of battles were lost due to a lack of reconnaissance. The love for the ambush makes this all the more surprising, because the armies had neither the flexibility nor the number of units to cope with surprise. John of Nassau notes that a badly trained army needed half a day just to deploy in battle order. Most early rebel armies fell into that category: mercenaries speaking several languages, put together in temporary units, led by commanders who often overestimated their cohesion and mobility. John says that battles were lost because commanders used deployments that their men had not sufficiently practised (e.g. Mookerheide, 1574). He stresses that in the face of the enemy, a unit should only advance straight ahead or retire straight back. Without drill or standard commands, even a normal infantry advance needed the men to pause to dress their ranks every few steps. At Noordhorn (1581) the rebels took hours to advance across just three ditches.

Armies rarely pursued after a victory, choosing instead to remain on the battlefield to rally and to divide the spoils. This was one disadvantage of employing mercenaries. Another was their demanding pay when the stakes where highest, even during battle: Jemmingen (1568) was lost because of this pernicious habit. Questionable loyalties were another issue: coats were turned and city gates opened for whoever offered the most. During the siege of Haarlem (1573) one of the German mercenary units defending the city for the rebels was that of Georg von Frundsberg, grandson of the famous Landsknecht leader. After the city surrendered, German troops were allowed to leave while the rest of the garrison were murdered, and Frundsberg immediately entered Spanish service, marching on to Alkmaar to help besiege it. Four years later his men turned him over to the rebel government – perhaps because they were offered more money *for* him than *by* him.

A typical but small army of the time was that at the battle of Noordhorn in 1581. This consisted of around 3,000 foot from 30 companies speaking five languages, in one huge block with a 'forlorn hope'; around 500 horse, in four squadrons; and between two and five fieldpieces. On paper this gives six manoeuvre units, if the forlorn hope is counted. In reality, however, the infantry consisted of a sluggish and uncontrollable mass, which did not even occupy 200ft (60m) of frontage. After the first charge, the cavalry – though concentrated in two wings – fragmented into its constituent parts, no longer supporting each other.

War for Independence, 1588–1620

Maurice reorganized infantry and cavalry into smaller, drilled and thus much more manoeuvrable battlefield units. For combat these would group together into larger, mutually supporting 'division-pairs' for the infantry and 'field regiments' for the cavalry. These again were grouped into 'brigades', arrayed in three lines. As before, infantry screens came from the units themselves, although now strictly controlled.

In 1599 the train too was reorganized and regulated, both on land and water. This was a logical next step, because a lack of supplies due to bad planning and organization had lost battles and sieges before. Use of

waterways greatly simplified logistics and shortened convoy lengths: just five river vessels carried as much cargo as more than 100 wagons. In many armies the wagon train would march on the flank if enemy might be near. Maurice only did this in the early 1590s; later there was no need, since drill allowed his army to deploy rapidly from the march into battle formation.

The train consisted of three parts: the artillery (including ammunition, engineering supplies, and spares), the baggage, and the provisions. Lists were made showing the exact amount of every item for a set number of men to take along on a campaign, from scaling ladders to nails, from beer kegs to hardtack biscuit. The train had its own military commander in permanent service, with his own unit to manage, control and police it. Horses, wagons and vessels were hired per campaign. The standard wagon was pulled by three horses to carry around 1,000lbs (500kg) of cargo. A typical infantry regiment of ten companies was allotted 18 wagons or three vessels. Higher ranks each had their own vessel, and there was even a fleet of small vessels reserved for mail and for the wounded. For example, a field army of 1599 counting 125 companies of infantry, 36 squadrons of cavalry, and 50 siege and field guns had a train of 400 wagons and 150 vessels.

If the army marched as a single column, pioneers and half or more of the cavalry would lead. Some of the artillery marched behind them. Then followed the infantry in three groups: the advance guard, the battle and the rear guard (rotating day by day), each group followed by their regiments' ammunition wagons. After these came the senior commanders, then the balance of the artillery, and then all the troops' baggage (first cavalry, then infantry, then artillery). The tail was formed by the remaining ammunition and provision wagons, and a force of cavalry and perhaps more pioneers closed the column.

Travelling along roads where possible, these columns were long and slow: by the time the van had pitched their tents in the new camp, the rear might still not have left the old camp 10 miles (15km) back. If terrain allowed, the army might alternatively march in three equal-sized columns on parallel routes, each with its own pioneers, ammunition and baggage. When marching across open fields the columns would be wider and thus shorter; when crossing a river or moving through woodland, special task forces with organized to pass and hold them.

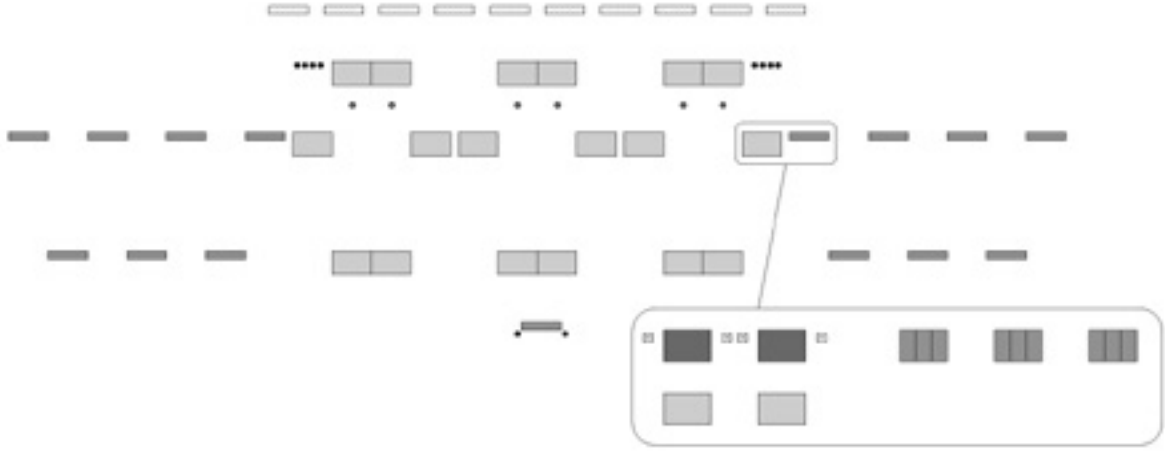
If battle was to be given, all officers down to regimental level received written orders on how to deploy and where, well beforehand. Arriving on the battlefield, the army would deploy in three lines, with the advance guard up front, the battle in the centre and the rear guard behind, with a small reserve still further back. This created depth against cavalry, lines that could support each other during the battle, and reserves. Drill allowed an army to deploy and change deployment much quicker than before: John of Nassau claims that Maurice's army could do so in 15 minutes. Perhaps more importantly, units did not need the constant attention of their commander to deploy and keep proper formations; a few simple commands now sufficed, instead of several hours of pushing, shoving and cursing.

As John notes, the first army to finish deployment will most likely win the battle. Maurice drilled his army as he did his soldiers: when on campaign it had to practise different deployments, retreats, and night

marches. Like many commanders, Maurice preferred to seek battle only when the deck was stacked in his favour. John warns that a commander should only do battle when he has a clear advantage, or lacks provisions or money which he needs to capture. Unlike a well-prepared siege, the outcome of an open-field battle on equal terms was unpredictable, which is why for every battle fought we can find another that was refused.

In the summer of 1602, for example, Maurice sought out a royalist army to do battle to relieve pressure on besieged Ostend. He crossed several small rivers to get close, but his opponent had deployed on a reinforced height with flanks well protected, refusing to come down. Maurice retreated back across one river and deployed there in the open. All pontoons were left intact to tempt the opponent to cross and engage; instead, the enemy commander sent out men by night to destroy the pontoons and the roads between the armies.

This almost-battle also saw some of the less common effects of weather (besides the oft-quoted rain extinguishing matchcord, wind blowing away priming powder, and sun, smoke and dust blinding the men). The day after the incident described was so hot that during the march 30



A typical army deployment under Fredrick Henry, to scale.

Along the front is a screen of skirmishers. The infantry in the middle are in three corps (left to right: rear guard, battle, advance guard), with conventional 12- and 24-pdr guns on the flanks (black circles), and 24-pdr drakes interspersed (open circles). The cavalry are on the extreme flanks, and a very small cavalry-and-gun reserve is at centre rear.

Each skirmisher bar is a 100-man company (totalling one regiment). Each infantry block is a 1,000-man 'division-pair' (ideally, a single administrative regiment), and each cavalry bar is a 'field regiment'. An army of this size might have more skirmishers (perhaps one regiment per corps), and probably more cavalry. If there was less cavalry, it would be parcelled out along the second and third lines, one squadron per interval.

If the enemy proves too strong, the first line is drilled to retire into the gaps in the second line, while continuing to fire; the enemy will thus be degraded before they meet the fresh blocks in the second line. Under Maurice the deployment would often be deeper, or have the infantry blocks arrayed in 'wedges'.

The detail box (also to scale) shows the make-up of an infantry division-pair and a cavalry field regiment. The two infantry 'divisions' are each 25 files wide, with the pikes in front and the muskets behind, both in ten ranks; each man occupies a space of 3ft x 3ft (1m square). Each division has a pair of 3-pdr 'battalion guns' (small dotted squares). Musketeers would walk forward into the intervals between the pikes to fire, as described in MAA 510. The cavalry regiment consists of three squadrons, each of three troops, each of five ranks and five files in close order.

The Danes were the first to try to copy the Dutch method, but failed. Next Gustavus Adolphus had some success with his Swedish adaptations, but these actually weakened his army. Reducing the number of cavalry and concentrating infantry ranks, while still deploying shot beside pike, gave less strength per file while increasing vulnerability to cavalry, and concentrating infantry 'brigades' reduced mobility and the intervals into which units could retire. (Author's diagram)

Englishmen and seven guardsmen died from heatstroke, while almost 6,000 men fell out by the wayside. That night it started to hail stones as big as 8oz (250gr), breaking windows and injuring men and horses alike. To make the experience complete, rain then came pouring down, drenching everything and everybody – but at least it quenched their thirst.

That army consisted of 19,000 foot from 140 companies, in around 36 divisions, in three corps; 5,500 horse from 50 squadrons, in 13 field regiments, in three corps (plus 1,000 forage horses); and 6x 48-pdrs, 12x 24-pdrs, 3x smaller pieces, plus the battalion guns. That totals 31 large manoeuvre units (infantry division-pairs and cavalry field regiments); however, on that occasion one division-pair of infantry occupied the same frontage as two field regiments of cavalry.

Coalition War, 1621–48

The first stage of the Maurician reforms brought organization, standardization and drill. The second stage added efficiency, balance and aggression.

All the firearms in an infantry unit were now the same (no more calivers), as was the armour of all the pikemen and cuirassiers (no more middle-rank armour). For every pikeman there was one musketeer, and for every cuirassier there was one carabineer. Infantry screens were now provided by independent and highly mobile skirmisher companies with specialized equipment (flintlock and vaulting-spear), in the field about one skirmisher company per division-pair. Battalion guns protected the infantry's flanks; this meant that infantry units could maintain their integrity and put all their focus forwards. Heavy artillery could keep pace with the advancing line. Carabineers were now numerous enough to charge flanks and follow up cuirassier successes, which freed the heavier cuirassiers to focus all their shock forwards too. The army still had an advance guard, a battle and a rear guard. But these would now deploy from right to left, the first one splitting into three lines and a reserve, the others doing likewise and lining up on the left of the one before. This increased the speed of deployment and decreased the risk that the delayed arrival of the next group used to present, when the long, single line of the advance guard could easily be pierced.

Cavalry continued to be deployed on the wings, although putting individual squadrons among the infantry was tried. John explains that such small numbers could prove decisive if the opponent does not have cavalry there, but it seems that the new mobile artillery with its canister shot was seen as better for that task than groups of horse wheeling around among the infantry.

Another interesting development were the *ad hoc* infantry groups created during campaigns to perform special missions. These regularly consisted of the elites of the army: the guard companies and each regimental colonel's company (foreshadowing the concentrated grenadier battalions of the 18th and early 19th centuries). During the siege of Den Bosch, for example, such a force was sent north to counter a diversionary invasion. On campaign the new 'flying brigades' of cavalry accompanied by spear-vaulting skirmishers allowed the army to scout more efficiently, but also acted aggressively to engage and hold objectives.

The army's marching column did not change much: several skirmisher companies would be put behind the pioneers in the van, and also

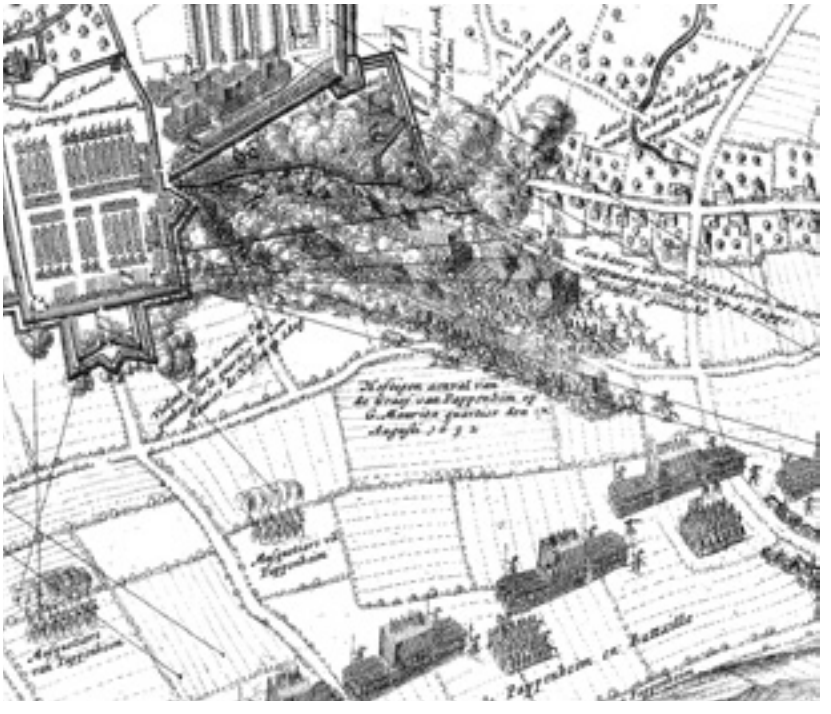
marched alongside the long train. Artillery in the van was more common, and would often be 24-pdr drakes.

Several detailed orders for river trains have been preserved from this period. In 1624 the army commander leads the other commanders and skirmishers in the van, followed by advance guard, battle and rear guard, each 'at a musket shot distance'. At the same intervals come the vessels carrying the artillery, and finally those with wagons and their teams. If the leading vessel lowered its sail and fired a shot, all others were to lower their sails and anchor where they were. Three shots was the summons for all officers of all regiments to gather on the army commander's vessel. In 1631 the musket-shot distance was changed to half-an-hour, and the convoy included cavalry in the rearmost vessels.

When it disembarked, the army transported in that river fleet used the same drill as its predecessors of 30 years earlier, but its division-pairs would now deploy with the musketeers behind the pikemen, shrinking their frontage. In other words, both the large manoeuvre units of the army (the infantry division-pair and the cavalry field regiment) now occupied the same frontage. With all its building blocks of the same size, planning and especially changing a battle-order was thus much easier. Based on this, we can assume that each skirmisher company deployed into a screen of similar width. Command was scaled up per two or three: each division-pair (or sometimes triple division) had a commander; a 'brigade' of two of these had a commander; and so on, up to commanders for wings, cavalry, and the army itself.

One force deployed outside Europe exemplifies the significant developments that had taken place during and since the Maurician phase of the 80 Years' War. In 1641 a States' force set sail from Brazil to Angola, to help local allies there defeat a Portuguese army (see MAA 510). It had 16 companies in four divisions (one division consisting solely of local Brazilian musketeers), three pairs of battalion guns, plus four skirmisher companies. The rebel infantry at Noordhorn in 1581 had had a similar

While wagons were used to carry supplies, and latterly also infantry when accompanying cavalry on long-range missions, the army's train also included many carriages for senior officers, their servants and baggage. Sieges also tended to attract a lot of foreign observers: commanders eager to study Maurice's reforms, rulers conducting diplomacy in the field, and aristocratic tourists. (Van de Velde after De Jonge, 1650s; RM)



Pamphlets, newspapers and maps were printed to circulate the stories of battles and sieges to a general audience. This detail shows the battle of Ammi during the siege of Maastricht in 1632, when Pappenheim launched a massive, bloody, but ultimately unsuccessful attack on Frederick Henry's sector. Italian *tercios* made several attempts on a weak spot where the 'line of circumvallation' had not been fully completed, but were mown down by artillery crossfire (shown here by ruled lines from the batteries), and failed to win the pike-fight along the embankment. (Savery, 1632; RM)

number of men, but the Brazil force had eight infantry manoeuvre units compared to the two at Noordhorn. The Brazil force occupied a frontage at least three times wider, yet still had a strong reserve and a well-organized screen. The number of guns was also roughly the same, but they were now mobile rather than sluggish, and canister ammunition predominated instead of roundshot. What the force from Brazil wore and carried was, at least to some extent, adapted to its environment; it was drilled, marched in step, and obeyed clear, consistent orders. In all these respects it would have been almost unrecognizable to its grandfathers at Noordhorn 60 years previously.

CONCLUSION

The 80 Years' War saw the birth of a nation – a new republic, which rose from a rebel regional upstart to a global power in barely 50 years. It did so by defeating the most widespread and richest empire then existing. The single most decisive factor in that success was the introduction of drill to its army in the military revolution realized by Maurice, Prince of Orange. Along with drill came standardization, regulation, budgeting and bookkeeping. He made units smaller and thus more manoeuvrable, deployed in three lines with a reserve (the points that John of Nassau keeps hammering home in his notes: the same number of men now gave generals more units, thus more flexibility *and* reserves). Maurice introduced specific education for officers, and created battalion artillery, a skirmisher corps and a dedicated logistics branch. He also transformed the temporary armies previously raised for single campaigns into a permanent force, to control costs and to prevent the trained men wandering off to take service elsewhere.

The one thing that made continued successful use of all these tools possible was drill: the limited set of simple two-part commands, executed in step and practised over and over again, from small units up to whole armies. This process turned raw recruits into dependable soldiers, since, as a side effect, it created *esprit de corps*. In most open-field battles the losses from the actual fighting were marginal compared to the butchery inflicted on a defeated and fleeing army. Battles were a matter of morale – of 'who blinks first'. Drill provided the States' troops with steadfastness, and inflicted losses on their opponents at a continuous and unrelenting rate. Both swayed the balance of morale in favour of the drilled unit – and even if it did blink, its drill gave it the means to retreat in good order instead of collapsing into a bloody rout.

The modernization of warfare

The 80 Years' War changed the craft of war into a science, and war became 'modern'. Since then, military theorists have put names to many concepts considered new in their time. Most of those concepts were already recognized and employed during the long war in the United Provinces – there just weren't any theorists to put labels on them.

For example, deep operations, which seek to hurt and disorganize far behind enemy lines, were quite common. Raiding forces disrupted logistical centres, destroyed mills and warehouses, and attacked mustering-centres. Examples abound: the rebel landing near Nijkerk in 1573 to intercept and destroy an enemy column returning home after a campaign; the 1591 raid to Lingen, which dispersed 2,400 freshly recruited royalists; the sudden and decisive taking of the royalist supply centre at Wesel in 1629, thus halting attempts to raise the siege of Den Bosch; or the damaging 1645 raid of some 30 miles (50km) from Maastricht to Tienen to surprise royalists in their supposedly safe village quarters, which took 27 banners. These also show every smart commander's preference for asymmetric warfare, and the search for the opponent's *Schwerpunkt*.

At the operational level, plans could be quite expansive. From the start the rebels planned for simultaneous invasions everywhere in the country. Part of the reason for the successful taking of Den Briel in 1572 was that it coincided with William's brother's invasion far to the south, taking Bergen (Mons). Siege campaigns and sieges themselves almost always included operational feints and relief attempts, like the battle at Mookerheide in 1574 to raise the siege of Leiden, or the marching and counter-marching that preceded the sudden pounce on Hulst in 1645. Strategically, the invasions of Angola (1620s and 1640s) aimed to cut off the source of income of the opponent in Brazil.

The legacy

The rebels' immediate legacy went far beyond the successes of some of their more illustrious descendants, like William's grandson Turenne or his great-grandson King William III. Maurice's success attracted many rulers and commanders to his court, and his ideas started to be copied abroad; first the Danes, then the Swedes, the French, the English and the rest started to address drill, organization and logistics. Drill turned citizens into obedient and effective soldiers; standardization allowed things to be scaled up; budgets and bookkeeping created dependable

Early in the war many innovations were tried out during sieges. Here, at Steenwijk in 1592, a raised mound allows artillery to shoot into the town (mortars later took over this function), and behind them an 'elevator' hoists up musketeers. Simple wooden siege towers were also built, but were unsuccessful: the defenders would shoot them to pieces using chain-shot. (Hogenberg, 1593; RM)

logistics; and all three made the creation of ever larger armies possible, with results that led eventually to the campaigns between armies hundreds of thousands strong in the Napoleonic and later wars.

Of the many important battles during the 80 Years' War, three stand out as being truly decisive. The victory at Den Briel in 1572, when rebels fought off the feared Spanish veterans, sparked off the general rebellion. Secondly, the rout of the rebels' first national army at Gembloers in 1578 led to the collapse of their wider, looser coalition, and put William the Silent and Holland at the head of a more concentrated and consistent effort that turned into the true war for national independence. Third was the victory of William's son Maurice at Nieuwpoort in 1600, which proved to the world that his revolutionary innovations did work. Copied by others, they became the foundations for the armies that would achieve Western hegemony by defeating much larger forces around the world 250–300 years later. Thus, Maurice of Nassau might arguably be seen as the most important commander, and Nieuwpoort as the most decisive battle, in modern history.

SELECT BIBLIOGRAPHY

This expands slightly on the listing on MAA 510; note that many more secondary titles will be found on www.80yw.org.

Hexham, H., *The Principles of the Art Military* (Delft, 1642)

Hondius, H., *Korte beschrijvinge, ende afbeeldinge van de generale regelen der Fortificatie, de Artillerie,* etc. (Den Haag, 1624)

Mulder, L., *Journaal van Anthonis Duyck, advokaat-fiskaal van den Raad van State (1591–1602)* Vols 1–3 (Den Haag, 1862, 1864 & 1866)

Petitot, M., *Collection Complète des Mémoires Relatives a l'Histoire de France, Tome XXIV & XXV* (Paris, 1822)

Puype, J.P. &. M. van der Hoeven ed., *Arsenal of the World, The Dutch Arms Trade in the Seventeenth Century* (Amsterdam 1996)

Verbeek, J.R., *Dutch East India Company's "Artilleriewezen", VOC Artillery 1602–1795* (tba, 2019)

PLATE COMMENTARIES

A: PENNONS, CORNETS & BANNERS

Very few reliable sources for flags of the States' cavalry are known for this period, but one beautiful exception is the De Gortter manuscript in the Royal Library in Brussels. This is a series of contemporary colour drawings of the dress and flags of units based in Mechelen (Malines) between 1577 and 1585. Among others, it shows two dozen rebel pennons and associated 'cassock' coats. Eight are shown here, to illustrate their diversity. They were between 1ft (30cm) and 2ft (60cm) long, with a few larger examples, and some had the coloured bands physically separated. The illustrated pennons belonged to the cavalry squadrons commanded by the following officers (in most cases the colours of the pennon corresponded to the colours of the cassock, but see also under B3):

A1: Captain Elias le Lion (or Leonidus), *c.* 1583. The unit served from 1577 to 1586.

A2: Captain Alonso Vanegas, a Spaniard in the States' service. Some companies in the army of the Duke of Anjou, who had been invited to become the rebels' sovereign, used similar pennons. Several rebel units had similar pennons but with an orange instead of a red band.

A3: Captain Beignatre.

A4: The Antwerp company, first under Capt Beckens, then Capt Conincxloo. This is an example of orange used to identify a rebel unit; the men themselves wore different colours.

A5: Captain Jacob de Haes (aka Bomme Haze); one of the units protecting the canal connecting Brussels with the north.

A6: De Haes' squadron again, but a few years later, shortly before being sent to the north-east in 1585.

A7: Colonel Olivier van den Tempel, governor of Brussels. His unit is an example of a colonel's company, i.e. the cavalry squadron maintained by many infantry colonels (his infantry regiment's banner is F3 in MAA 510). In 1585 Lt Louis Laurens took over this mixed unit; in 1599 command passed to Peter, Lord of Bréauté, famous for his 'duel' with Leckerbeetje in 1600 (see caption, page 10).

A8: Captain Colbau's mixed unit; commissioned in 1579 as pistoleers, but one-third converted to harquebusiers in 1580. It was sent to Bergen (Mons) in 1581, then north again, when some or all of the men converted to lancers.

Below the pennons are three 'cornets' regularly seen in later paintings. This contemporary term, like 'ensign' in the infantry, confusingly referred to a flag, the rank of the officer who carried it, and the size of unit. **(A9)** and **(A10)** also show up among the banners captured at Kallo in 1638, on Peter Paul Rubens' Triumphal Chariot sketch. The lilies were probably used by French units, and indeed one of the four cuirassier squadrons present at Kallo was that of Col Pierre du Four, Lord of Le Metz. The yellow wreath on red **(A11)** is unidentified.

A12: The banner of the commissioner of munitions; alternatively, it could show a shovel and spade. It was to be flown on his tent, wagon, and also his river vessel, so quartermasters could easily find the army's magazine. The master-general of artillery had a white flag showing a cannon in its centre, his lieutenant one with a cannon along the bottom, and the government commissioner for artillery an orange-white-and-blue flag with a cannon in the white band. Every other wagon or vessel in the train had to fly a small pennon: artillery, white swallow-tailed; munitions, blue; engineering, yellow-black; and provisions, red. This system prevented a lot of the disorder common in trains and columns, and thwarted the attempts of sutlers' wagons to secretly join the column.

A13: Finally, this is the regulation regimental infantry ensign as of 1617, in the opposite colours to the previous design (see MAA 510, Plate F6).

B & C: CIVIL WAR CAVALRY, *c.* 1580

Blackening armour to prevent rust was required by regulations. Usually a mixture of linseed oil and soot was used, which left a permanent black layer after heating. More costly methods gave brownish or blueish results. Most arms and armour depicted in these plates are based on the collection of the National Military Museum.

B1: German mercenary *reiter* pistoleer

Basically a mounted Landsknecht, he wears simple blackened armour on his upper body only. These troops were the first to use blacking on a large scale, and thus were often simply called 'black riders'. His shot-proof (hopefully) cuirass is quite heavy, so he saves some extra weight by only wearing one gauntlet on his 'bridle' hand. His helmet, a burgonet with hinged cheek-pieces, tries to have the best of both worlds, open and closed. His war-hammer and wheellock pistols are quite effective against well-armoured cavalry. The key to span the pistols is just visible hanging from his waist belt. The *reiters* were by no means exclusively armed with pistols; harquebusiers were also seen, and even the occasional lancer unit.

B2: Lancer, Pierre de Voisin's *bande*

This 'red lancer' is from one of the last *'bandes d'ordonnance'*; based in Mechelen in around 1580, they had a simple red lance pennon. Unlike the *reiter*, most other cavalry wore cassocks. These usually showed false sleeves; vertical lines corresponding to the colour of the lining; extensive horizontal braiding for the knots across the breast; and – for lancers – a slit in the right breast for the lance rest. His lower legs lack armour, but his horse still has a chamfron, and there are plates on the saddle. His close-helmet has a riveted-on collar, and a three-part visor with all elements pivoted at the same point. Voisin was lieutenant-general of the rebel cavalry. Hans Bernard, the commander of William the Silent's harqebusier guards, later took over command of this unit; after he was killed at Nieuwpoort, it became Frederick Henry's.

B3: Harquebusier, Colonel van den Tempel's squadron

He is armed with a typical wheellock gun of the period, and a sword passing through a slit in the cassock at his left hip. Van den Tempel (see pennon A7) had a mixed unit; his lancers had bright armour, and his men wore green cassocks with white lining and grey trousers. The shirt worn under the cassock has an added *fraise* collar and matching cuffs.

The cassocks of units carrying the other pennons shown on Plate A were as follows: Capt le Lion's lancers (A1) wore green cassocks with yellow lining, and grey trousers, with bright armour; they were known as the 'green frocks', and half the unit were harquebusiers. Captain Alonso's lancers (A2) had a blue cassock with white lining, red trousers, and bright armour. Captain Beignatre's lancers (A3) had blackened armour and

red trousers, but no cassock. The Antwerp lancers (A4) at first wore blackened armour, a grey cassock with red lining, and green trousers, but under Conincxloo this changed to bright armour, a red cassock with white trim but green lining, and dark blue trousers. Captain de Haes' lancers (A5) had a red cassock with yellow lining, and a yellow band across the front like Plate C3, over bright armour. A few years later (A6) this changed to blackened armour, and a red cassock with yellow lining. Captain Colbau's lancers (A8) had a blue cassock with white lining, red trousers and bright armour; his unarmoured harquebusiers wore grey coats and red trousers.

C1: Lancer, unidentified Dutch unit

Also based in Mechelen around 1580, he displays the gentleman's fashions of the day, with a tall hat and *fraise* collar (though the latter is flattened, since he has just taken off his helmet – see photos below). Note that under his blue-trimmed white cassock his cuirass is polished bright, while his arm defences and gauntlets, like his close-helmet, are blackened and polished. His unit's pennon was a tricolour like Capt Alonso's (see A2), but with an orange band instead of red.

C2: Pistoleer, William of Orange's Guard

Note the infantry-style helmet. The false sleeves of the orange cassock, trimmed in white, are wrapped around the upper arms. Typical for the early period are the still relatively short pistols, with both holsters hung on one side. This was a mixed unit which also had lancers and harquebusiers; the harquebusiers wore a sleeved mantle like that of the halberdier foot guard (see MAA 510, page 12).

C3: Michiel Caulhier

The first cavalry unit on the States' payroll, already fighting at Haarlem in 1573, was that of Michiel Caulhier. He is depicted here as seen later in Mechelen, holding an expensive wheellock harquebus, although his troopers were pistoleers. The blackened morion helmet is trimmed with fur at the comb and brim. The black velvet cassock, with gold trim, shows a diagonal of orange embroidery – this is not a separate sash. Note the silvery appearance of the silk shirt. Michiel – who is rarely mentioned by his last name – would also raise an infantry regiment.

D: WAR FOR INDEPENDENCE CAVALRY, c. 1600

D1: Cuirassier, middle ranks

Sometime between 1597 and 1600 the States' troopers stopped wearing cassocks and started wearing orange waist sashes over their blackened armour instead. This trooper wears a closed burgonet with 'falling *buffes*' (aka Hungarian visors – see page 14), regularly seen among the States' cavalry. The *buffes* could be lowered in two stages; on older helmets they were separate pieces, but by this time they were attached to the helmet. During this period cavalry swords started to get longer than infantry weapons. From a blade of around 2.5ft (75cm) up until the 1590s, they grew to 3ft or even 3.5ft (90–115cm), coinciding with the new cavalry tactics introduced by Maurice.

D2: Cuirassier officer, front rank

This officer, like the front-rank troopers, has extra armour on his lower back, thighs and knees, and wears a shot-proof cuirass; the breast could be strengthened further by fixing an extra plate to the front. His close-helmet is of later design than that in Plate B2, with a simpler visor. The browned finish and brass details of his armour mark him out as a wealthy man; his officer status is indicated by his plumes, and the orange sash worn over his right shoulder, with long hanging ends behind his left hip. His sword would resemble that of D1.

Typical close-helmet, with a plume holder low on the back, showing the different ways the two-part visor could be raised to improve visibility and ventilation (see Plate B2). It was heavy, and had only a few small breathing holes in the lower visor; any larger openings would invite a pistol muzzle to be thrust against them. It was also quite unwieldy to put on – see back cover for a view of it fully opened. (Courtesy Peter Finer, Dealers in Antiques Arms and Armour, London)

By now the wheellock pistols had grown longer, and holsters hung on each side of the saddle pommel. The holsters are of a length to accommodate barrels about 2ft (60cm) long, so are attached to the breast strap as well as the pommel; the top of the nearside open holster is folded down, and the spanner and powder flask hang behind it.

D3: Carabinier
This dismounted trooper has an open burgonet helmet with hinged cheek-pieces, a gorget and a cuirass. Over his left shoulder he wears the typical crossbelt with a hook to hang his wheellock carbine, by means of a ring sliding along a metal rod on one side. His spanner, powder flask and bullet bag hang at his hip, partly hidden by the broad sash. Any element of formal unit 'uniform' had disappeared with the cassock (but see E1).

E: COALITION WAR CAVALRY, *c.* 1640

E1: Trumpeter
The cassock with false sleeves was long retained by trumpeters, and this figure is based on Ter Borch's painting of 1653. Their costume did not change much throughout the period except for the evolving fashions of trousers, collar and hat.

Although 'cassocks' were no longer used with armour after the turn of the century, they continued in use by riders such as trumpeters (see Plate E1). This pale brown example was worn by Ernst Casimir of Nassau when he was shot through the head during a siege in 1632. Of wool, linen and silk, it closely resembles the cut of the cassocks worn by the early Guard cavalry harquebusiers and foot halberdiers, with slits for the sleeves of the coat worn underneath. (RM)

E2: Carabineer
This trooper wears a buff coat, a cuirass, and the popular 'pot' helmet inspired by the eastern European *zischagge.* With a neck guard of articulated lames, hinged cheek-pieces and a sliding nasal bar, this was the commonest type on most European battlefields from this date until after the end of the century. His sword is a so-called Pappenheimer, the typical broadsword during the 30 Years' War, *(Detail)* one way to carry the carbine tool and munitions was a broad hanging leather strap looped to the belt on the right side; this had the bullet bag mounted at the top, above retaining loops for the spanner and at the bottom for the flask, each with retention cords long enough for them to be lifted out and used.

E3: General in cuirassier armour
Dutch cuirassiers of the 1640s, including the mid-rankers, continued to wear armour from head to knee, with shot-proof cuirass and helmet. This senior commander, based on period portraits of the Stead-Holder William II, is a young nobleman in expensive blued armour, carrying his closed burgonet with barred visor. The latest fashion demanded little facial hair, a draped collar with lace fringe, and a flamboyant hat, and it was in the mid-1640s that the hair began to be worn quite long. His broadsword is an *'épée Wallone'* (so named by the French after they captured huge stocks in Maastricht and other Dutch cities in 1672), a widely used cavalry weapon until well into the 18th century. Not illustrated, but exemplifying the late trend towards heavy firepower, he might carry a short, heavy wheellock pistol – a four-barrelled, multi-shot weapon taking superimposed loads, theoretically able to shoot a continuous salvo of 15 shots at five-second intervals with just one pull of the trigger (mishaps must have been frequent, and often lethal). The barrel of one example is 9ins (23cm) long, but 14ins (38cm) carbine versions were also used by the States' cavalry.

F: LIMBERED FIELDPIECE, 1620s
The limber and carriage of this 12-pdr bronze gun **(1)** are as per regulation, made of oiled wood. Note the cannon brand on the rump of the thill horse between the limber shafts, which might have a spare horse tethered beside it awaiting a change-over. Traces pass forward to the team of paired draft horses, which might number ten to 16 for a full-size 12-pdr, but only two to four for a lightened 'drake'. The bronze gun has the typical decorative elements used by the States' foundries (see page 15), such as 'dolphin' lifting brackets, foliate bands, and the arms and motto 'Je Maintiendrai' of Nassau. The touchhole is uncovered, though later in the war hinged lids began to be seen.

The figure **(2)** is the train commander, who would normally be mounted, and had a company of armed riders to help him police the column. His tasks were to ensure that order was maintained, wagons kept moving, bridges and roads stayed clear, and outsiders – such as unauthorized sutlers – did not slip into the column (hence the whip). For personal protection he had saddle pistols, and here carries an elegant rapier, although his mere presence and the consequences of his wrath would normally ensure obedience.

(3) shows a single-shaft limber for paired horses, an alternative to the usual type with two shafts for a single 'thiller'. **(4)** shows the frontal aspect of a typical gun and

carriage. At **(5)** are examples of ammunition – a bagged cartridge (powder charge), canister, and round shot. **(6)** illustrates two types of linstock, the longer probably for carrying lit match, and the shorter for firing. **(7)** illustrates period matchcord, and the tinder, flint and steel striker that every gunner would have carried.

G: BATTALION GUN, 1620s

As yet the author has been unable to find any drawings or illustrations of the carriage for the 3-pdr drake, so we base this carriage on the one used not long after the war. It is a logical design to be pulled by a single horse or four men, its two shafts each with two handles along the sides. The wheels are as tall as for the 12-pdr, but of much lighter construction; tall wheels and a light barrel (less than 300lbs/150kg) allowed for good cross-country mobility. This gun is being manhandled forwards by civilian labourers hired for the purpose **(1 & 2)**; alternatively, because these guns always operated alongside infantry units, the extra two or three helpers might be supplied by that unit. Normally a gun this size only required one gunner and three helpers.

The gunner/officer **(3)** wears the normal fashions of the day (including his moustache and beard), since there were no regulations concerning his dress. His tools were a powder horn; a scraper/pricker, used to clean fouling out of the touchhole and to pierce the cartridge through it; and a ruler-stick and calliper, to measure roundshot. Note the linstock with a double-ended burning match; for siege work he would also have his elevation quadrant for calculating long-range aim. His assistant gunner **(4)**, perhaps a sailor detached from the navy, carries the long powder ladle and sponge shafts, each with a rammer on the other end. Among the other items enlarged at **(5)** are sheepskin to cover, clean and cool the gun; linen powder cartridges; and canister rounds – a thin metal cylindrical container with a wooden bottom. Some were filled with iron balls instead of lead: supposedly, lead balls might fuse from the heat of the discharge.

In the background are two baggage wagons, copied from contemporary sources; see commentary to A12.

H: IN THE TRENCHES, 1630s

H1: Engineer

Camps, fortifications and trenches all required an engineer to make calculations and produce plans. This highly educated gentleman would carry the tools of his trade: map, pens, compass, ruler and wooden telescope. He is armed with a handsome rapier slung on a shoulder belt.

H2: Miner

The man who had to put theory into practice works well within range of enemy marksmen, so wears a special heavy shot-proof helmet and cuirass. Instead of a sash, he wears an orange kerchief tied around his arm to identify him. His tools are a metal-clad shovel and a mattock. No regulations govern his equipment, but in case of a short-range encounter in a tunnel he carries a four-barrelled 'turnover' flintlock pistol; twisting the loaded barrels in front of the lock in turn will give him four aimed shots in rapid succession. Immediately after the powder charge in the head of his tunnel explodes he will join the final wave of the breach assault party, to start enlarging the hole blown in the enemy's works.

H3: Sergeant grenadier

If the miner has done his job properly, this will be the first man through the breach after the explosion (if he hasn't, then the sergeant may be buried alive). He wears common styles of helmet, cuirass and buff coat for the period, with undyed clothes; after blue, this was the second most common 'colour' mentioned in texts. His sidearm is an ordinary infantry sword with a 25.6ins (60cm) blade. He holds a typical brass 5lb (2.5kg) hand grenade, and, for the chaotic mêlée that will follow the assault, he has acquired a 27.5ins (70cm)-long flintlock double-barrelled 'turnover' cavalry pistol. Unlike H2's, this has the barrels turning at the point behind the pan and frizzen, so needs two sets of these.

Buff coats became common after the truce of 1609–21 (see Plate H3). This example, lacking the front laces, was worn by Henry Casimir of Nassau-Dietz when he was fatally shot through the lower back during the taking of a redoubt near Hulst in 1640. Henry had succeeded his father Ernst Casimir as *Stadhouder* of the northern provinces after he too had been killed during the fight for a city. Normally the buff coat would be worn under shot-proof armour, but the uncomfortable weight of such protection sometimes led senior officers to take unwise risks. (RM)

INDEX

Figures in **bold** refer to illustrations.

12 Years' Truce 4, 5, 10, 15, 17
80 Years' War 3, 6, 15, 21, 23, 40, 41, 42, 43

advance guard 37, **38**, 39, 40
ambushes **10**, 36
ammunition 11, 12, 16, 19, **36**, 37, 41, 47
  48-pdr **16**, 17, 18, 19, 39; 24-pdr **15**, 16, 17, **18**, 19, 20, 21, **38**, 39, 40; 24-pdr drakes 16, 20, 21, **38**, 40; 12-pdr **15**, 16, 19, 20, 21, **F30**, **38**, 46, 47; 12-pdr drake 16;6-pdr **15**, **16**, 19, 20, 21; 6-pdr drake 16, 20; 3-pdr drake 16, 21, 47
Angola 40, 42
Antwerp 4, 5, 34, 44, 45
armour 8, 9, **11**, 12, **13**, 14, **E29**, 33, 35, 39, 44, 45, **46**, **47**
arsenals 15, 16, 17, 19, 20
artillery 3, **15**, 16, 17, 18, 19, **20**, 23, 34, 35, 37, 39, 40, **41**, **43**, 44
assaults 24, 34, 47

bandes 7, **B26**, 44
bandes d'ordonnance 6, 44
banners **A25**, 33, 42, 44
batteries 16, 20, 24, **33**, **41**
battlefields **7**, 9, 10, 15, 17, 21, 22, 23, 33, 36, 37, 46
battles: Heiligerlee (1568) 3, 4, 6, 36; Mookerheide (1574) 7, 36, 42; Nieuwpoort (1600) 3, 4, 6, 10, 12, **18**, 22, 35, 43, 44; Noordhorn, (1581) 22, 36, 40, 41; Turnhout (1597) 12, 17, 35
blokwagen (four-wheeled wagon) 17, 19
bookkeeping **3**, 17, 22, 41, 42
Brazil 5, 40, 41, 42
breast plates 8, 12
breastwork 21, 24
Bréauté, Capt Pierre de **10**, 44
bridge-of-boats 23, **24**
bridges 21, 23, **24**, 46
bridging 23, **24**
broadswords 8, 46
budgeting 22, 41, 42
bullet bags 8, 46

campaigns 6, 10, 11, 12, 13, 16, 17, 22, 23, **24**, 34, 35, **36**, 37, 39, 41, 42, 43
canister 17, **18**, 19, 21, 39, 41, 47
cannons 15, 17, 18, 19, 44, 46
carabineers 6, 9, 10, 11, 12, 13, 14, **E29**, 39, 46
carabiniers **D28**, 46
carriages 16, 17, 18, 19, **40**, 46, 47
cartridges 12, 17, 19, 47
Casimir of Nassau, Ernst 35, **46**, **47**
Casimir of Nassau-Dietz, Henry 35, **47**
cassocks **6**, 8, 12, 44, 45, **46**
casualties 34, 35
Caulhier, Michiel **C27**, 45
cavalry 3, **6**, **7**, 8, **9**, **11**, 12, 13, 14, 16, 21, 22, **B26**, **C27**, **D28**, **E29**, 34, **35**, 36, 37, **38**, 39, **40**, 44, 45, **46**, 47
circumvallation, line of 24, **41**
civil war, 1568–87 3, 4, 6, 15, **B26**, **C27**, 35, 44
coalition war, 1621–48 5, 13, 19, 20, **E29**, 39, 46
connectors 17, 19
convoys 6, 37, 40
cornets 6, **7**, 8, 9, **A25**, 44
cuirasses 8, 12, **13**, 14, 44, 45, 46, 47
cuirassiers **6**, **8**, 9, **10**, 12, **13**, 14, **D28**, **E29**, 39, 44, 45, 46

Den Briel 4, 42, 43
deployment 6, 10, 35, 36, 37, **38**, 39
drill 3, **6**, **8**, 9, 11, 12, 14, 24, 35, 36, 37, **38**, 39, 40, 41, 42
drummers 22, 23, 24

elevation 18, 19, 47
engineering 3, 21, 22, 24, 37, 44
engineers 5, 22, **H32**, 47
England 6, 14
equipment 3, 6, 8, 12, 13, 14, 16, 19, 20, 21, 24, 39, 47
Europe 3, 20, 40, 46
explosions 18, 34, 47

fieldpieces 16, 17, 18, 19, **F30**, 36, 46
fieldworks 14, **24**, **33**
firearms 11, 12, 14, 39
flintlocks 13, 14, 34, 39, 47
fords 23, **24**
'forlorn hope' 8, 35, 36
fortifications **3**, 19, 21, 22, 33, 35, 47
France 3, 4, 5, 6, 8, **15**

Gembloers 3, 4, 43
Germany 3, 23
grenadiers 33, 34, 39
  sergeant grenadiers **H32**, 47
gunboats 17, 19
gunpowder 12, **15**, 17, 18, 19, 24, 34, **36**

Hague, The 4, 17, **20**, 21
harquebusiers 6, 7, 8, 9, **B26**, 44, 45, **46**
helmets 8, 12, **14**, 35, 45, 46, 47
  close-helmet **14**, 44, **45**; shot-proof **13**, 47
Henry, Frederick 3, 5, 14, 24, **33**, 35, **41**, 44
holsters 8, 12, 45, 46

infantry **3**, **6**, 7, **8**, 9, 11, 12, 13, 14, **15**, 16, 17, 20, 21, 34, 35, **36**, 37, **38**, 39, **40**, 41, 44, 45, 47

lancers **6**, 7, 8, **9**, 10, 12, **13**, **B26**, **C27**, 44, 45
logistics 18, 37, 41, 42, 43
Low Countries, the 3, 6, 23

Maastricht 4, 5, **41**, 42, 46
manoeuvres **7**, **9**, 11, 12, 16, 20, 35, 36, 39, 40, 41
marches/marching 10, 11, 12, 17, 18, 20, 23, 24, **35**, 36, 37, 38, 39, 40, 41, 42
  counter-marching **7**, 12, 42
matchcords 36, 38, 47
mêlées **10**, 12, 14, 47
mercenaries 7, 8, **B26**, 34, 36, 44
Meuse, the 21, **24**
miners 24, **H32**, 33, 47
mortars 16, 17, 19, 20, **43**
musketeers 6, **22**, 34, **38**, 39, 40, **43**
muzzles **11**, 18, **45**

Nassau, Maurice of **3**, 4, 5, **7**, **9**, 10, 12, **13**, **15**, **16**, 17, **18**, 19, **20**, 21, 22, 23, 24, **33**, **35**, 36, 37, **38**, **40**, 41, 42, 43, 45
Netherlands/Holland 3, 4, 6, 23, **24**, 43
noblemen 16, 20, 34, 46

Orange, William 'the Silent', Prince of 3, 16, 21, **C27**, 45
organization 6, 9, 13, 15, 16, 17, 20, **22**, 36, 39, 42

pennons 6, 8, **A25**, 44, 45
pikemen 12, 34, 39, 40
pioneers **18**, **22**, **35**, 37, 39
pistoleers 6, 7, 8, **9**, **B26**, **C27**, 44, 45
plumes 8, 13, 14, 35, **45**
pommels 8, 12, 46
powder flasks 8, 46
prisoners **10**, 12, 22
provisions 37, 38, 44

rear guard 37, **38**, 39, 40
rebels 3, 4, 6, 7, 8, 12, 16, 35, 36, 40, 41, 42, 43, 44
retreats 11, 16, 37, 38, 42
roundshot **16**, 19, 21, 41, 47
royalists 3, 4, **10**, 12, 13, 14, **18**, 34, 38, 42

sieges 3, **16**, 17, 18, 20, 21, 22, 23, 24, 34, 36, **40**, **41**, 42, **43**
  Bergen op Zoom 4, 5, 13, 14, 18, **22**; Breda (1637) 4, 5, 24, **33**; Den Bosch 4, 5, **10**, 14, 20, **22**, 24, 39, 42; Haarlem (1573) 4, 36, 45; Hulst (1645) 4, 5, 24, 42, **47**; Maastricht (1632) **41**; Ostend (1601–04) 4, 18, 24, 33, 34, 38; Rijnberk (1586–90) 4, 5, 24; Steenwijk (1592) 4, 33, **43**
skirmishers 3, 7, 10, 13, 14, 34, **38**, 39, 40, 41
snaphaunce 14, **24**
Stadhouder (Stead-holder') 3, 4, 34, **47**
States General ('States'), the 3, **6**, **7**, **9**, 10, 12, 13, 14, **16**, 17, 18, 19, 20, **22**, 24, 33, 40, 42, 44, 45, 46
Stevin, Simon **3**, 22, 23
strengtheners 17, 19

tactics 6, **9**, 13, 24, 45
tactical units 3, 13
Tempel, Colonel Olivier van den **B26**, 44
thiller 17, 20, 46
tools 3, 8, 12, 19, 42, 46, 47
trenches 24, **H32**, **33**, 47
trumpeters 6, **7**, 9, 11, **E29**, **46**

United Provinces 3, 4, 42

valkonet ('falconet') 16, 19
vaulting-spears 13, 34, 39
Voisin, Pierre de **B26**, 44

war for independence, 1588–1620 4, 9, 17, **D28**, 36, 45
wheellocks **12**, **24**, 44, 45
  carbines 8, 46; pistols 8, **11**, 44, 46
William II, King 5, 46

Osprey Publishing
c/o Bloomsbury Publishing Plc
PO Box 883, Oxford, OX1 9PL, UK
Or
c/o Bloomsbury Publishing Inc.
1385 Broadway, 5th Floor, New York, NY 10018, USA
E-mail: info@ospreypublishing.com

www.ospreypublishing.com

OSPREY is a trademark of Osprey Publishing Ltd, a division of Bloomsbury Publishing Plc.

First published in Great Britain in 2017.

© 2017 Osprey Publishing Ltd

All rights reserved. No part of this publication may be used or reproduced in any form without the prior written permission, except in the case of brief quotations embodied in critical articles or reviews. Enquiries should be addressed to the Publisher.

A CIP catalogue record for this book is available from the British Library.

ISBN: PB: 978 1 47281 914 7
ePub: 978 1 47281 916 1
ePDF: 978 1 47281 915 4
XML 978 1 47282 712 8

Editor Martin Windrow
Index by Mark Swift
Typeset in Helvetica Neue and ITC New Baskerville
Page layouts by PDQ Digital Media Solutions, Bungay, UK

Osprey Publishing supports the Woodland Trust, the UK's leading woodland conservation charity. Between 2014 and 2018 our donations are being spent on their Centenary Woods project in the UK.

To find out more about our authors and books visit **www.ospreypublishing.com**. Here you will find extracts, author interviews, details of forthcoming events and the option to sign up for our newsletter.

TITLE PAGE: Carabiniers attacking cuirassiers in a late-war cavalry engagement. If the carabiniers belong to the States' army, they risk heavy fines from the government commissioner for not wearing helmets. (De Jonge, 1640s; RM)
BACK COVER: Fully opened view of the close-helmet illustrated on page 45, showing lining and fastening straps. (Courtesy Peter Finer, Dealers in Antique Arms & Armour, London)

Artist's note

Readers may care to note that the original paintings from which the colour plates in this book were prepared are available for private sale. All reproduction copyright whatsoever is retained by the Publishers. All enquiries should be addressed to: www.gerryembleton.com

The Publishers regret that they can enter into no correspondence upon this matter.

Acknowledgements

The author would like to thank the staff of the Koninklijke Bibliotheek (Royal Library), the Koninklijke Verzamelingen, Archief (Royal House Archives), and the Nationaal Archief (National Archives), all in The Hague, for their superb assistance.

Picture credits: KB = Koninklijke Bibliotheek, KV = Koninlijke Verzamelingen, and RM = Rijksmuseum, Amsterdam.

The illustrator would like to thank Camille and Anne for their help during the preparation of the colour plates.

Author's Note

The Rhineland rod (*roede*) is a common measure of distance on period maps, and Holland and the States General used no other from the early 17th century onward. One Rhineland rod is 12 Rhineland feet, one foot is 12 thumbs, one thumb is 12 lines, and one line is 12 points. One Rhineland rod equals 3.767m (12ft 4in).
There is only so much that one can stuff into 48 pages; inevitably, many diagrams, details, flags and interesting anecdotes did not make the cut, but these will find a place on the author's website www.80YW.org.

Errata & addenda to MAA 510:

page 8: The map scale line should read '60 miles'

page 10 Chronology, battles omitted: 1581 (Kollum, Grijpskenk); 1582 Ghent (B2, Gh); 1583 Steenbergen (B2, 54 - the second battle in quick succession); 1592 Coevorden (E4, just NE of 48); 1595 Luxemburg (with France); and 1625 Breda (C2, 77).

page 24 the caption incorrectly states that the current Dutch monarch is a descendant of Frederick Henry; King William Alexander in fact descends from the Frisian *Stadhouders* Ernst Casimir and his son Henry Casimir of Nassau, both killed during sieges of the 80 Years' War.

page 36 the Spanish *tercio* in the diagram is shown correctly with 20 ranks, but described incorrectly as having ten ranks.

page 42 Regimental Genealogy: Regiment 17 in fact traces its origins back further – 1578 Entens, 1580 Wigbolt van Eussum, 1584 Caspar van Eussum, who was still leading it in the field after 1594.